THE

SURVEYOR, ENGINEER, AND ARCHITECT:

FOR THE YEAR

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CONDUCTED BY ROBERT MUDIE.

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PREFACE.

On completing the second volume of "The Surveyor, Engineer, and Architect," it gives us great pleasure to say, that we have been enabled gradually to bring it nearer to that plan which we have always had in view, and the completion of which we regard as a most important desideratum in that department of literature, the object of which is to explain and illustrate the Engineering arts, and those arts and sciences which are connected with them. We wish to find no fault with any of our contemporary Journals; for they are no doubt conducted according to the plan and wish of the parties concerned, and conducive to the purposes which those parties have in view. But, with great submission and deference, we take the liberty of stating, that not any one of those Journals, or the whole of them taken together, appears to pursue—and they certainly do not accomplish,—that in which we conceive the very essence of a journal of the kind alluded to consists. Many of the articles which they contain are no better than newspaper paragraphs; and, were it not that the scientific journals are monthly, and the newspapers appear at shorter periods, it would be difficult to distinguish the one from the other. Proper advantage is not even taken of the additional time which elapses, to correct the mistakes inseparable from the hurry with which newspaper articles are got up, or to give the proper substance of those articles in fewer words. Sometimes the newspaper account is given verbatim, and when this is not the case, it is as much shortened in substance as in the number of words. Portions are left out which are always necessary to the sense, and sometimes the most important part of the whole, and thus the papers are reduced to detached fragments, among which there is no principle of connection.

The articles which profess to be original, are different from these, and newer, but certainly not better. They consist of notices of inventions, in which nothing useful appears to have been invented; of puffs of what is done, drawn up by the doers themselves; or of puffs by friends of the author of the article, or some one who wishes well to him, or who regards him as a friend, or man of talent. In respect to merit, they have various degrees, some being good, others indifferent, and others, again, absolutely bad. But, whatever may be their merits, there is one general objection to them all, affecting the class, and not the individuals. They are detached scraps; and how well soever any of them may bear upon its own subject, none of them bears upon anything else. They make it appear that there is not only no connection between the arts and sciences, between art and art, or between science and science, but that there is no connection between the different parts of the same art, or the same science. They thus give a most erroneous

view, especially of the arts, which are the portion of the subject that comes most naturally before the public. They represent each art as being an assemblage of jobs, not connected with each other, but merely called by one general name, and this view is of course taken up by the public. A job is always looked upon with an eye of suspicion; and so the art, and the science as it comes before the public by means of the art, have the suspicion of a job attached to them in every part.

This is a decided evil, because it brings the whole into discredit with the public, and thus renders the most ingenious and elegant conception of mind, or the noblest work of art, not a subject of admiration, as it ought to be, but one of questionable character, that needs to be watched. Hence, in a moral point of view, the first-rate engineer, architect, or other artist of the very highest class, is regarded in the same light as a menial who would shrink from his work, or perform it in a slovenly and imperfect manner, if not watched with the most scrutinising and continual care. This degradation of artists in the opinion of the public, is inseparable from a degradation of the arts themselves; and while such continues to be the case, they never will thrive as they ought to do. It is in Britain, especially, that this degradation of the arts operates with full effect; and though foreigners are less able to support arts and artists, they do it in a much more complete manner than is done in Britain. The reason is pretty obvious: almost every application of the more exalted arts is, in Britain, a job—something in which the one party is constantly upon the watch, lest the other should get too much; and that other party is as continually upon the alert, to get as much as ever he can without paying much attention as to how it is got. Thus, the engagement with an artist for the invention and execution of the noblest work to which he can give origin, involves, or rather resolves itself, into a higgling about bargain and sale, and this leads to the employment of the cheapest artist, rather than the best, or, if a good one enters upon this system, he very soon becomes degenerated and vicious. He is taught by the very practice of his profession, to look upon money as the most valuable and estimable of all objects, superior to anything of mere art; and thus, whatever he may be nominally, he is really a tradesman, and thinks more of the increase of his wages, than of the elevation of his craft. This in great part results from the fact that, among us, the employers of artists are private individuals, and their being so individualises the artist whom they employ, by sinking him to a mean mercenary. In foreign countries, the case is very different; for there the artist is not individualized, and consequently the art is not degraded, but takes its ground in proportion to what it is in itself, and not to the money which it brings. This higher state of things arises from the public as one, or rather the public rulers, being the chief promoters of the arts. This superior state of things is manifested in the foreign journals of the Engineering and collateral arts and sciences; and, were it not for what we have stated, it would appear passing strange that they who have the best and most abundant materials, should rear the very worst structures of this kind.

Among the other mischiefs that arise from the individualising of the Engineering

sciences we shall mention only two, and these we shall do little else than name. In the first place, the professional man in general is ignorant of those collateral sciences which are essential to the right performance of his duty. For instance, the Surveyor, considered as a land-measurer, seldom knows any thing beyond the areas of surfaces, and the means of ascertaining them; and thus, though he may be able, with ever so much accuracy, to tell a proprietor how many acres are in his estate, he cannot tell what those acres are worth, or how their worth may be increased. In like manner the Engineer is often ignorant of geology, and the action of rivers upon their banks, and of the sea upon its shores; the consequence is, that when any of these, as is often the case, enters largely as an element into the work which he is called upon to do, that work is generally performed in a bungling and imperfect manner, which would not be the case if he were properly acquainted with the collateral sciences. The other evil which we shall mention is, a want of knowledge of the relations between the past and the present, a knowledge which is very essential, as being fraught with experimental information. Without this, the whole is little better than guess-work, founded on presumptions, not upon proofs; and yet, induction is as necessary in those arts, and the sciences upon which they depend, as any other branch of knowledge or pursuit, be it what it may. In all matters the past is our proper and only safeguard in the management of the present; it tells us what has succeeded, and the cause of the success; and also what has failed, and the cause of the failure; and by these means we are enabled to adopt the one and reject the other.

The lessons which the past gives us, must, however, be received with modifications. We must not continue implicitly to do any thing merely because it has been formerly done, or to reject any thing because it has been formerly rejected; for were we to do this, we should in all probability be more wrong than right. The past is not the conclusion at which we are to arrive,—it is merely the foundation upon which our reasonings are to be grounded; and, though we start with it, we must modify it according to present circumstances. Thus, opinions and things which were once in vogue, are found to be incorrect or improper, or they merely fall into desuetude, and these we must abandon and discharge. Then again, new opinions, new facts, new operations, and new results, are continually arising, and to these we must pay all due attention. We must do this, not only because they are new, though that is in their favour, but because they are more authentic as principles, and more useful as results, than those which have been discarded to make room for them. This superiority is not universal and absolute; for there are errors in what is new as well as in what is old; but still the presumption is, that the new is the most accurate and the most useful. New principles, and new applications of those principles, arise every day, or, in other words, every new day brings its accession of science and of art, which make constant additions to the sum of our knowledge, and enable us to reason, judge, and act more usefully to-day than we did yesterday. Besides the direct advantages of this attention to the past, there are some indirect evils against which we must guard. Among these, one is very common, namely, bringing for-

ward as new something which is really old, and the proposing of means of procedure which have been formerly tried and have failed. But in the rejecting of what has thus failed we must use discrimination: there are some things which, though plausible enough in the judgment of ignorance, are utterly impossible, and not to be accomplished by the help of any thing that can be discovered. But there are very many which were at one time found to be impossible, but which have since been not merely possible, but very easy in accomplishment, in consequence of some intermediate discovery. Thus, the perpetual motion, which has been so long the occupation of ignorance, and with which the ultra-stupid sometimes even now puzzle their heads, is a palpable impossibility; while the results which have been effected by means of steam would have been scouted by those who believed in the perpetual motion, and diligently sought for it with perfect confidence of success.

We have mentioned those matters as the grand omissions of the scientific journals of the day; well convinced that by omitting such they have neglected the really valuable part of their journals. Aware of this, we have pursued a very different course in conducting the "SURVEYOR, ENGINEER, AND ARCHITECT." We have not willingly omitted any important matter on account of having an improbable appearance, or of relating to things of the day; on the other hand, we have not allowed ourselves to be carried away by such matters; but have endeavoured to bring before our readers the connections and relations, as well as the simple and temporary facts.

To accomplish this, even in a very imperfect manner, we have found to be a work of no small labour. Unless in the mere balaam, or mere collection of scraps, which is necessary in every journal, but which can be gleaned from the newspapers as easily and well as from any other source, we have found our contemporaries of little use; and thus the scissors, that grand tool of inexperienced editors, was *tabooed* to us at the very outset. This, however, gave us but little inconvenience. Again, the ordinary writers, who supply matter for such journals, we found equally unavailing; and not only this, but as the perusal of such writings as we have mentioned has given a bias to the public mind, we found many new writers, willing and qualified to assist us, who were unable to get out of the rut of this thinking and expression: this is the reason why many articles, the substance of which has been supplied by others, appear anonymously in our pages.

Under such circucumstances it is evident that the progress of our Journal among the public would have been slower than one more ephemeral; but it is calculated to be more sure. In spite of all these difficulties we have succeeded; our success is greater and greater every day; and we hope that the increase of our usefulness is in the same proportion.

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THE SURVEYOR, ENGINEER, AND ARCHITECT;

OR,

LONDON MONTHLY JOURNAL OF THE PHYSICAL AND PRACTICAL SCIENCES

IN ALL THEIR DEPARTMENTS.

BY A COMMITTEE OF PRACTICAL SURVEYORS, ENGINEERS, AND ARCHITECTS, OF MUCH EXPERIENCE AND IN ACTIVE EMPLOYMENT.

ROBERT MUDIE, LITERARY CONDUCTOR.

ELEMENTARY LESSONS

IN THE THREE PROFESSIONS, OR ANY OF THEM.

NO. I.—INTRODUCTORY.

We have been solicited, again and again, both by known correspondents and by anonymous ones, to insert occasionally in the "Surveyor, Engineer, and Architect," short lessons of some of the leading principles by which the practice of the three professions to which it is chiefly devoted is, or ought to be regulated. In a matter of this kind, it would be very desirable to gratify each, and all, of those who have applied to us. There is, however, some difficulty in knowing how this is to be done, and what to select, so as to meet the wishes of those who are desirous of obtaining information. The chief cause of this difficulty lies in the nature of the professions themselves. They are not merely technical or mechanical trades, in which every one who engages has nothing to do but tread in the footsteps of those who went before him, and follow these implicitly without deviation, or thought about the matter. It is true that this has been by far too much the case, in Surveying and Architecture especially; and till within these few years, that architect was bold indeed who dared to strike out anything new; and much the same may be said in the matter of Surveying. Engineers, as a profession, are much the juniors of both Surveyors and Architects; and as the youngest children of time are always understood to have the greatest energy, and the most inventive wits, Engineers, especially those of any eminence, have never got so deeply into the rut as either of the elder professions. All three professions are, however, to a very great extent, inventive, rather than mechanical; and, therefore, the very first lesson to be inculcated upon every one who aspires to eminence in any of them, is to keep himself so completely free of technical trammels, as to be able to avail himself of all the special circumstances of the particular case that comes before him.

Of Surveying, we need say but little in this respect, because the Surveyor is not the direct planner or constructor of any work which remains palpable to criticism, how essential soever his labours may be to the real merit of those works, for which others get all the praise, or all the blame, as it may turn out. But Engineers and Architects should be specially on their guard against the fetters of mere imitation; and unless this is begun early—indeed, unless it has become in some sort a habit, or fixed part of the character, before the aspirant enters upon the technical part of his profession, there is great difficulty in acquiring it afterwards. We believe we may say with some confidence, that some of the best, especially of Engineers, have been those who rose to the profession, rather than those who were bred up in it. But, in consequence of the increased demand for Engineers, they must now be grown professionally in offices, in the same manner, though not with the same dull mill-horse routine, as the articled clerks of lawyers. Wherever there are the relations of master and pupil, matters must be badly managed indeed, if the pupil has not such respect for the master, as will make him prefer the plans of that master to those of any one else. Now, to do this, and at the same time to preserve that independence of the professional mind which shall enable the young professional man to take every case upon its own merits as soon as he is entrusted with the management, is somewhat difficult.

This indispensable part of the education, or preparing, of him who is to be an Engineer or Architect, for carrying his profession, whichever it may be, to a higher degree of usefulness and elegance than it has been carried before his time, is not to be acquired in the ordinary way of schools and colleges, however necessary the education obtainable there may be in an auxiliary point of view. To be qualified for entering upon the profession with a fair prospect of success, it is necessary that the aspirant to either profession should be well acquainted with the mathematical and physical sciences; and it is also desirable that he should be better acquainted with the structure of language, and more ready in the use of it, than the reports and writings of many other men, no wise deficient in the technical parts of their professions, show them to be. But it must not be lost sight of, that, to the Engineer or the Architect, mere school education, whatever may be its quality and extent, is, after all, merely a tool, not of value to a man in the ratio of its own qualities, but in a ratio compounded of that and his knowledge of the use of it. A very cursory glance at the school exercises and progress of many, we may say the majority, of those who receive what is called, and what probably deserves to be called, a first-rate education in the schools and colleges,—a very cursory glance at this, in comparison with their future capacity, and conduct in life, will afford convincing proof that a very large portion of their technical education falls within the category of unprofitable tools, the nature, and almost the name of which the party forgets, simply because he has no occasion to use them. Then, when in addition to this, we call to mind that the ghosts of many things, which are in themselves perfectly useless for all practical purposes, continue to haunt the schools, and the more perseveringly the more lofty the name, long after they have been exorcised and expelled from the working part of the world, we must come to the conclusion that it is just as impossible to prepare an Engineer or Architect by mere schooling, as to gather grapes of thorns or figs of thistles.

We have already endeavoured to show that that spirit which is alone fitted for conducting a man to eminence and excellence as an Engineer or Architect, cannot be acquired in the office of his professional master or instructor, however eminent that party may be; and we have now hinted—and every one who knows anything about the real facts of the case, must at once acknowledge the truth of the hint,—that this spirit is not to be obtained from any schooling, however sounding in name, or substantial in reality. What then, it may be asked, is to be done? Are we to trust to nature for our Engineers and Architects, just in the same manner as we must trust to nature for such weather as the passing day may bring forth?

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To nature we must in so far look for every thing; but still it would just as vain to look for an Engineer or Architect in wild nature, as for a railroad or a palace. Must the party then have a "genius" for his profession? He may, after he thoroughly understands it, and if he does this well, he needs must; but no man ever yet had a "genius" for that of which he was utterly ignorant; and as children at their birth are in total ignorance of the world and every thing in it, they cannot, at that early stage of their existence, be said to have a genius for anything. The term "genius" is a personification, very nearly allied to that imaginary being, who in the highly figurative language of the East is termed a genie, though it is a metaphysical personification—the personifying of a name, not the imagining of a fancied but non-existent personage. That which we call by this very vague and misleading name, is nothing more than the result of a habit of constant and minute observation—observation of all subjects that present themselves to the attention, in those early years where curiosity, the great teacher of knowledge, is in the prime of its vigour. In this, the only intelligible sense of the word, all mankind are possessed of a capacity for genius, but whether this capacity shall or shall not obtain the reality, depends upon the circumstances in which the young are placed.

In rude states of society, where there is no science, and the few arts are of the most rude and simple description, there is no field for the acquiring of genius; and therefore we never find Engineers, Architects, or any other professional men springing up and arriving great eminence among the savage tribes. There, one man may carve his war club more neatly, or wield it more daringly or dexterously than another; but there is no progressive movement in art, science is unknown, and, what is more striking, and makes more for the argument we mean to raise, the productions and the course of events in nature, though in themselves they may be, to men more advanced, of the most attractive character, pass almost or altogether unheeded.

Now, if there were any such distinction among mankind as that which is called original genius, surely we might find a genius for the study of nature among those tribes who have no arts, and who are absolved from the troubles and trifles of civilized life? But such is not the fact: there are no ornithologists among the wild woodsmen of Australia or Brazil, redolent as the forests there are of birds of the most attractive plumage. These attractions of nature have no more charms capable of enticing the savage to the study of nature, than the numerous waterfalls of North America have the power of inspiring the wild Indian of that country with the art of constructing a water wheel to assist him in his labour.

Such being the universal and invaluable fact, to which there is not a single contradiction on the record, the fair and necessary deduction is, that it is only among those who know the sciences and practise the arts of civilized life, that any one can become fitted for eminence in those sciences and arts. From this again it follows, that he who wishes to learn and to practise successfully such an occupation as that of an Engineer or Architect, must have that preparatory education, which an enlightened and improved country alone can afford, whether in the theoretical lessons of its schools, or the practical examples of ordinary society. Attention to both of these is necessary, and they should be attended to from the very beginning. Mere schooling will not do of itself, because the tendency of it is to make the individual pedantic, and, as such, unfit for the business of real life. As little will mere attention to the conduct of others in what they accomplish, in the means which they employ for this purpose, and in the results, of itself, alone, answer the purpose. There are many cases of observation in which the assistance of school education is necessary; and therefore, the more schooling that the candidate for success as an Engineer or Architect—or indeed as anything higher than a mere hewer of wood and drawer of water—can obtain, so much the better, due care being always taken that the lesson of the school does not so absorb the time and attention, as to destroy or weaken the at least equally important lesson which should be derived from observing the practical actions of the world around one, from their causes to their consequences, and carefully noting the particular circumstances which ensure success or occasion failure. Necessary as a proper balance between those two branches of general, or elementary education, obviously is to youths of all classes, whatever professions they may afterwards follow, it is but too frequently overlooked; for the event shows, that sometimes the one, sometimes the other, and sometimes both, are neglected, and the result is the production of a pedant, a plodder, or one fit for very little good.

But, granting that the balance is kept even between the two branches, and that each is pursued as extensively and vigorously as time and circumstances will admit, this, though it may do very well for ordinary occupations, is not enough for an Engineer, an Architect, or any one else whose business and duty it is to improve society and its accommodations with sound judgment and good taste, and to the utmost extent of a daily increasing ability. Nothing can, by possibility, be learned, either from the schools or from society, except that of which these are already in possession; and as the most praiseworthy portion of professional duty, on the part of those for whom we more immediately allude, is to contrive and bring forward what is new and superior, the aspirant must have within him the desire of getting above both the schools and society. Under these terms we of course include all that can be obtained from direct teaching, from reading, and from the workings and works of other men, in every age; and as this is the foundation upon which the aspirant must rear his improved structures, his acquaintance with all its departments cannot be too extensive. The full extent of it cannot be obtained before the student enters the office of his master, nor indeed until he has been for a very considerable time engaged in his profession; and therefore the desire of extending it, on every possible occasion, and by every possible means, should be carefully kept up, and guarded against the seductions of the love of pleasure, the love of gain, and even the love of applause, in one to whom the public award the palm of success.

All this is necessary; but though it is obtained to the utmost possible extent, it is not enough. It is, so to speak, the body of improvement; but it is not the living body; and, therefore, we desiderate the spirit. In its early beginnings, this spirit is simple enough; for it is nothing more than that independence of mind, which, while it yields ready obedience to every just and proper demand of others, and follows its directors in action, yet reserves its own impartial judgment of the merits and bearings of every case, as a portion of that most valuable fabric of self-education, which is commonly known by the name of genius, or original genius, and which is the real source of all inventions and improvements—even such as are commonly, but most erroneously, attributed to chance. This "chance" is a term of the same class as "genius"—a short and unmeaning name for a varied and complicated reality; and the use of it generally implies nothing more than that the user is ignorant of the cause of that which he attributes to it.

In this view of it—and we know it is the right one—genius may be considered as a branch of education, whether preparatory or professional. The three branches are these,—Schooling, including instruction of all kinds;—Experience, including all kinds of simple personal observation; and Genius, which is the result of the mental comparisons and judgments of the subjects of schooling and experience, so as to have them always ready to meet the emergencies of a new case, or improve upon that which has been previously accomplished. The precise period of life at which these begin cannot be determined; but as it depends very much upon the circumstances in which the party is placed, it must differ in different individuals. There is reason to believe, however, that the capacity exists in every individual from the earliest moment at which that individual begins to take notice; and that, in this early stage, the beginning of all is coeval, and their strength and capability of improvement exactly the same. If this could be attended to until the character were a little formed, the good that would result would be incalculable; but unfortunately this is a part of the duty of parents and teachers, which is never once named, recognized, or even alluded to, in the majority of families, or in any of the schools. For this reason it ought to be more frequently explained, and more earnestly inculcated, than any one single branch of either of its three departments, or of the technical applications of them; and this is the reason why we have assigned it so prominent a place in our first elementary lesson.

It is to be observed, however, that though genius, in this, the only rational meaning of the term, produces results which draw the attention of mankind much more strongly than either of the others, yet that it can no more usefully exist without them, than they can be productive of improvements and inventions without it. Hence, there is some caution necessary in the management of it. The fascinations which the opinion of the world has thrown around it, have, independently altogether of its own real merits, made it an attribute, to the possession of which all persons, except the merest vulgar, are very eager to lay claim; and therefore the claim is not unfrequently in the inverse ratio of the title. This is especially the case in what are called "Inventions," more particularly in mechanical inventions, or those which depend upon mechanical and chemical principles jointly. So numerous are the instances of failure in these, and so obvious, *à priori*, is the certainty of failure to any one who understands the case, that the patent roll is in great part a catalogue, and the modern museums, magazines of the blundering efforts of those who fancy they have inventive genius, when in truth they have not even the knowledge and common sense necessary for distinguishing what is useful from what is useless, or what is possible from what is impossible. Therefore, though genius, guided by the requisite degree of knowledge, is the very highest quality which an Engineer, an Architect, or a member of any other profession admitting improvement—as what profession does not—can possess, yet the ignorant counterfeit of genius is the most paltry and pitiable mode of self-admiration wherewithal any unhappy wight can be afflicted. Therefore, while the young Engineer or Architect, or the young aspirant to any other important art ought to strive with all diligence and labour to preserve the spirit, and collect the materials of genius, he ought never to rest satisfied with his present portion of it, or let it be known to the world in anything but its results.

What we have stated in our preceding remarks, is a sort of summary of the general character which every young man should bring with him when he enters upon his profession; and the three grand divisions of it should be so exactly balanced as that they may proceed with equal growth in all the course of his after life and experience. In our attempt to trace this outline, it may be thought that we have not been technical enough; but the truth is, that technicality is the bane of all education—more especially all English education, whether preparatory or professional. That a boy will make a better Surveyor, Engineer, or Architect, or indeed any thing else, by being trained to subjects analogous to it from the first day of his schooling, is not an uncommon opinion; but is an exceedingly erroneous one. Any one who has taken note of the progress of men in life, cannot fail to have observed that precocity in any one technical matter invariably dies out, if it does not kill its possessor, long before that period of life at which a man can be reasonably expected to have had that experience and personal observation which alone can make him truly great. The once loudly trumpeted, but now long-forgotten, "Young Roscius," is a remarkable instance of this, in which the young boy took the character of a man upon the stage, but could not sustain it nearly up to manhood in years; and many other instances will occur to any one who has studied the progress of human beings.

For this, and for other reasons which, though equally cogent, we shall not enumerate, we would by no means recommend that the school education of any boy should have an exclusive, or even a decided leaning to the technicalities of any one profession. This is the rock upon which the education of the schools and colleges has a strong tendency, if not a certainty, to split. In the common routine, the result of the school education, even if carried to its utmost, is to manufacture schoolmasters; and if this is followed out by the utmost extent of college attendance, the result of the mere teaching is nothing farther than a tendency to manufacture schoolmasters of somewhat more lofty pretence. In saying this, we mean no disrespect to the parties: it is the necessary consequence of the system to which they are tied, and we doubt very much whether this system can be changed, until some Bacon of education shall arise, so thoroughly acquainted with the system of the schools, and with the nature and wants of the working world, as that he can amalgamate the two, in like manner as his great predecessor amalgamated Learning and Experience in the case of philosophy.

The general education, whether acquired in the schools, or in the family, ought to be the education of a man, and of such a kind as to fit him almost equally for any situation in active life, because it is impossible to ascertain what may ultimately be the profession in which the party may rise to eminence, or by which he may support himself creditably in the world. It may not in every case be practicable, but in all cases it is desirable, that a young man should select his own profession; and before he can do this with advantage, his education must in all cases be far advanced, and in many cases entirely completed. It is not desirable that young men should invariably follow those professions with which they are most conversant in their boyish days; because their very familiarity with these makes them pay far less attention to them than they would do to others in which there is more novelty; and if we are to do proper justice to youth, we must keep the love of novelty alive, though under such restraint of other principles, as that it may not produce lightness and instability of character. We have practical proof of the truth of this general principle, in the fact that the sons of eminent professional men, especially Engineers and Architects, very rarely attain equal eminence with their fathers; and in the majority

of cases they are very inferior. It follows from this, that there is some danger in blending the technicalities of the future profession with the proper business of elementary education, as this not only takes off much of the novelty of the profession, when regularly entered upon, but has a tendency to reduce the general character and conduct of the party to those of a mere imitator, who, instead of improving, will dodge on in the dull routine of repeating what has been done before.

From these observations, those who have not thought much upon the subject will naturally ask, "Is there nothing to be taught at school, which can be of use to a man professionally, as an Engineer, an Architect, or any thing else?" To which we answer, that nothing should be taught at school but that which is to be useful to the pupil in future life: but that the utility of general education should be such as that it will be as useful in one profession as in another—the proper object of the school being to communicate knowledge, and the more general that this knowledge is, it is the more valuable. No doubt there are certain branches of school education, which are, as we have already said, of great use to a man in the practice of Surveying, Engineering, and Architecture; but, as we also said, they are chiefly useful as tools. Our next lesson shall contain some account of the leading ones.

ON THE ELECTRICITY AND EXPLOSIVE FORCE OF STEAM, AND ON THE ECONOMY OF THE HOT-BLAST FURNACE.

Much curiosity has lately been excited by the electrical phenomena observed in the condensation of the steam which escaped from a high-pressure boiler at Cramlington Colliery, near Newcastle, and which was briefly this: The engine-man, when happening to be standing where the steam, issuing from a leaky joint, was condensing into a cloud about his legs, put his hand to the lever of the safety-valve, and instantly experienced an electrical shock. Scientific men, on examining this phenomenon, found the electricity so evolved to be positive; but it is curious to observe how inaccurately in other respects they have expressed themselves regarding the phenomenon, calling it, "the rapid production of electricity which appears to accompany the generation of steam," "the evolution of electricity by vaporisation," and "the evolution of electricity during the conversion of water into vapour;" whereas the electricity was evidently evolved by a process just the very reverse, viz., by the sudden change of transparent steam into water; for a cloud just consists of minute drops of water. The novelty in this case, seems, after all, to consist chiefly in the intensity of the electricity; for the evolution of positive electricity, where transparent aqueous vapour suddenly assumes the form of a cloud, has been so often observed before, as to leave little doubt that it will be found to hold universally when once adequate means have been devised for detecting it; and conversely, that steam, instead of evolving electricity at its formation, must then absorb it as a necessary and constitutional ingredient. Dr. Faraday thinks the case observed at the Cramlington Colliery, "brings us much nearer to the electrical phenomena of volcanos, water-spouts, and thunder-storms than before;" but not nearer, I presume, than Mr. Espy's new theory does; because it just refers those phenomena to the evolution of electricity by the sudden condensation of aqueous vapours.

Water requires a higher temperature to make it boil in a glass vessel than in one of metal, and in the former, too, it boils more violently, probably because the glass, being a non-conductor, cannot so well supply the electricity for the promotion of steam. When, therefore, the lower part of a steam boiler becomes incrusted with a bad conductor of electricity, the temperature may be raised till the water boil so violently, especially under the feeble pressure of the imperfectly formed steam, as to reach the upper parts of the boiler, which, having little or no incrustation, may then supply the electricity so suddenly to the water and steam, already at a high temperature, as to increase the force of the steam to a degree which occasions a violent explosion before there is time for the safety-valve being acted on, or giving sufficient vent to the steam. But this I only mention, as one of the various causes to which explosions may be ascribed.

Since air, while it expands by having its temperature raised under a constant pressure, absorbs a considerable portion of latent heat, and still more if the pressure be decreasing, it probably also, at the same time, like steam, absorbs a corresponding portion of electricity. Now, I presume it is on this principle that we are to seek for an explanation of the economy of the hot-blast furnace. When cold and compressed air is forcibly injected into the fire, the fuel and bricks, being generally bad conductors of electricity, cannot supply it with sufficient promptitude or quantity both for the expansion of the air and for the formation of the gaseous products of the combustion. Hence, the process proceeds more languidly than when the air has been previously heated, and supplied with a corresponding share of electricity.—*Jamieson's Philosophical Journal.*

SHRAPNEL ON RAILWAY CARRIAGES.

To the Managing Committee of the London and Birmingham Railway.

Gentlemen,

In submitting to your judgment my methods of preventing locomotive engines from running off the rails, and of preventing or lessening accidents arising from trains running against each other, or in meeting other obstacles, I shall not trouble you with mechanical details for putting the same into practice, being fully persuaded your extensive experience in such matters will readily suggest the best modes of application.

My method of preventing an engine from running off the rails will be better understood by reference to the drawing, *fig.* 1, which represents a locomotive engine of the ordinary construction, in front of which is firmly attached a pair of wheels (A), of similar dimensions to the pair usually placed in front of the engine (see B) and which, from the use to which they are applied, I call *pilot wheels*, and which I propose to revolve independent of each other; they are jointed to the engine-frame at C. The upper part of the engine-frame is elongated at D, so as to form a *stop*, which prevents the pilot wheels from rising beyond a limited point. The advantage of this contrivance is as follows:—The pilot wheels will always act as certain and safe conductors to the engine in its course onwards, and in the event of the engine *jumping* from accidental causes, the pilot wheels (from gravity) remain on the rails, thereby preventing the engine from making any lateral movement; consequently it will resume its natural place upon the rails. Suppose again one of the rails to be displaced, broken, or to have received some injury, the pilot wheels will proceed in their proper direction (the engine being a momentary conductor), and as soon as the front wheels B B are over the broken

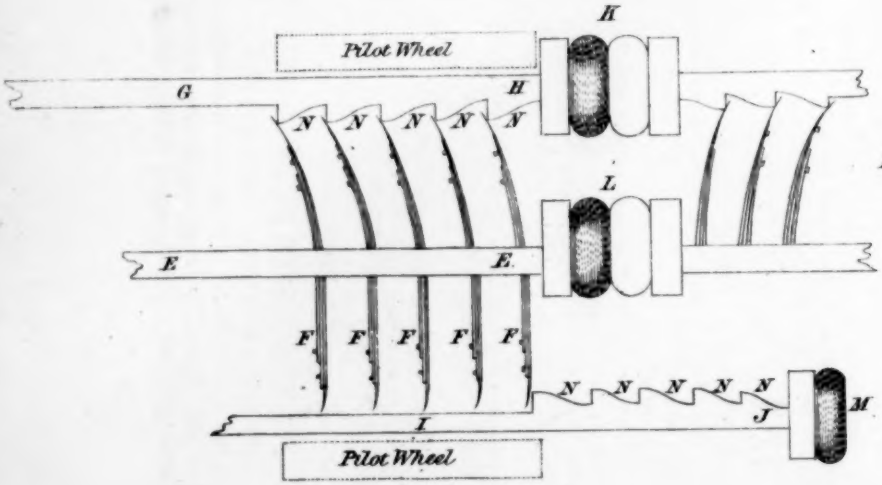


Fig: 2.

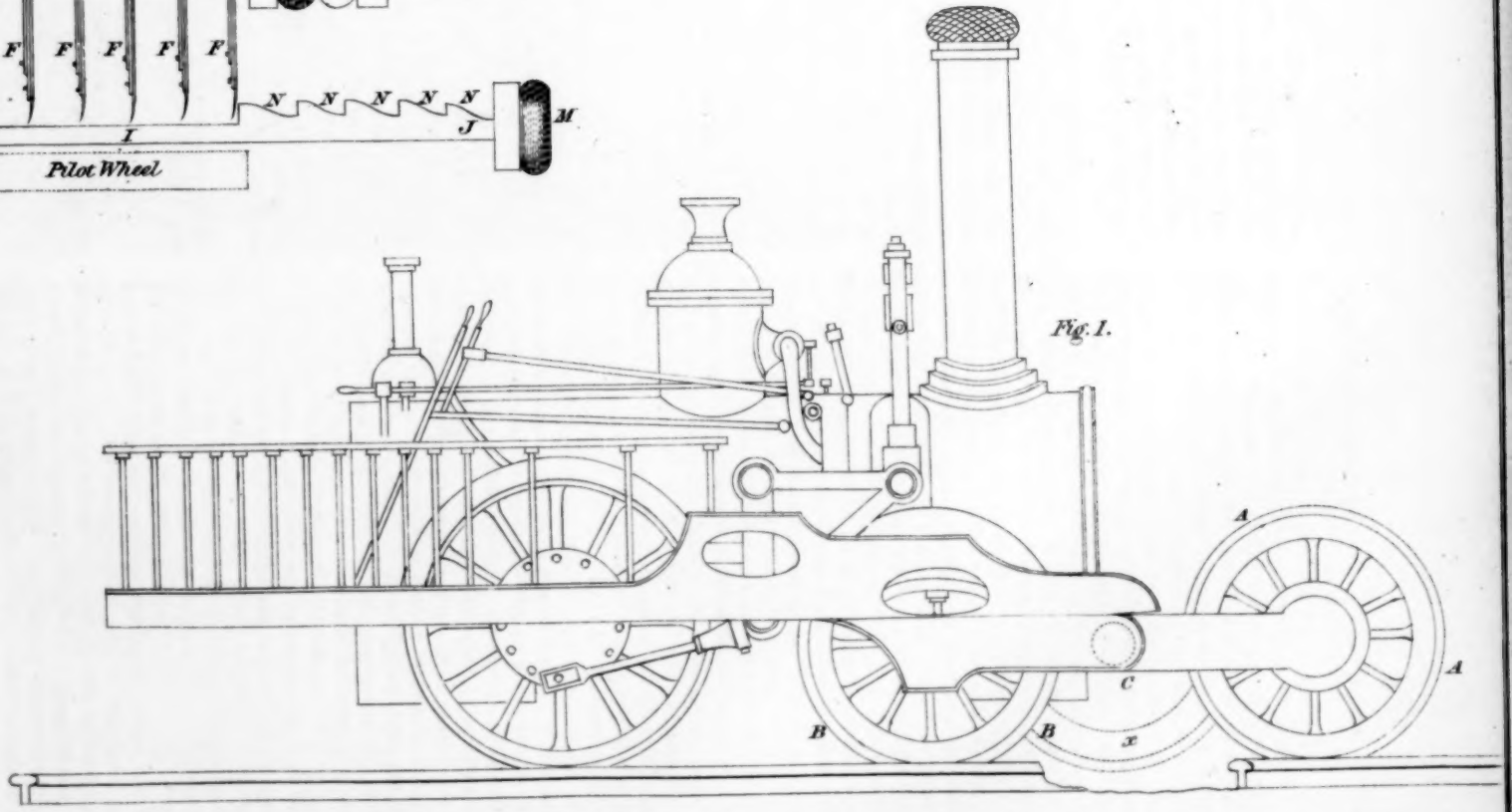


Fig: 1.

London, Published by Wm S. Orr, & Co Amen Corner. Feb.y 1841.

rail, they do not sink (see the dotted wheel *x*), because the engine becomes supported by the pilot wheels and the hind wheels, consequently the wheels BB are guided over the broken rail to their proper place. As it seldom happens the broken or injured part extends for any great length, it is clear that if the distance between the centres of the pilot wheels, AA, and front wheels, BB, is greater, the engine will be supported by the pilot wheels and its last ones; indeed, if the engine be placed in any situation to cause an accident, the pilot wheels will be of the greatest service, and in the event of running into another train, not so much damage will be done from concussion.

My plan for preventing or diminishing accidents arising from concussions, produced by a train in motion meeting or running into another, or from being met by one, itself being at rest, will be understood by the following description, reference being had to the drawing, *fig.* 2, which represents a plan of part of a railway-carriage, or engine-frame, with my proposed apparatus attached, and shown partly in action.—EE is a strong central bar or rod, which is firmly attached to the carriage or engine-frame, and forming part of it; to this bar is fixed a certain number of springs, FFFFF; the ends of these are free when not in action, as seen on the lower side of the drawing. Along each side of the carriage-frame is a sliding-rod, GH and IJ, to the ends of which are attached the buffers K and M; the sliding-rods, GH and IJ, have the same number of projections or racket-teeth as there are springs, FF, &c.; the action of this invention is as follows:—Suppose an engine or carriage to run in upon another furnished with this apparatus, the buffer-heads will strike K and M, and force the projections or racket-teeth NN, &c. alternately against the ends of the springs FF, &c., and thus *gradually* communicate the momentum to the bar EE and its train of carriages; and if the force is not very great, only a few springs will come into action, and thus it becomes *self-adjusting*. It may be necessary to add, the racket-tooth presses first on one spring, which, when bent to its full extent, flies back to its place and is met by the second racket-tooth: two springs are then set into play, and so on, so that the concussion becomes *gradual*, and the resistance multiplied according to pressure. A further resistance may be obtained if the springs be thought not sufficiently powerful, namely, a suitable frame or brake may be made to act upon the pilot wheels (see dotted wheels, *fig.* 2); and after the springs have performed their part, the base of the buffers will come in contact with the pilot wheels, as at K, and consequently augment the friction of those wheels on the rails. Again, in the breaking of a wheel or both wheels of the engine, the pilot wheels will be found of infinite service.

I now, gentlemen, leave my proposal to your judgment and decision, hoping it may be found of benefit to the Company as well as public safety.

I have the honour to be, gentlemen,
Your most obedient servant,
H. N. S. SHRAPNEL.

A WESTMINSTER REVIEWER VERSUS MR. TITE.

IN THE MATTER OF THE ROYAL EXCHANGE.

Westminster Review, Vol. XXXV., No. 1, *Art.* 3.

THE title which we have chosen is not that under which the article whereupon we propose to offer a few simple observations appears in the Review, neither does that title express all the subjects professed to be treated of in that article. It is cunningly devised as it were, that is, it would have been cunningly devised if the reviewer had possessed the requisite degree of cunning for such a purpose. We have a professed disquisition upon architectural competitions; a copious and gratuitous abuse of all committees connected with the new Royal Exchange, whether these consisted of the Gresham Committee, the Mercers' Company, or the City of London, as more immediately interested in the expense, substantiality and durability of the work, or of architects who sat in judgment upon the designs of the competitors, and rejected them,—in our opinion, very properly. In addition to this, we have every one of those designs which contained anything in the slightest degree resembling any part of Mr. Tite's design brought ostentatiously forward, for the purpose of showing that such parts could not choose but have been pirated or stolen from these parties by Mr. Tite; and that, while thus pirated or stolen, they have been also vitiated. One of the most glaring of these is the insinuation, or rather the broad assertion, that Mr. Tite has stolen Mr. Donaldson's design en masse; and clumsily endeavoured to hide the wholesale theft, by vitiating every part of it. To persons of sense and discernment, who are competent to judge of such matters, and have their understanding so free from prejudice as to be able to come to a sound judgment, it would be quite enough to say that there is not one word of truth in the whole of these assertions; but the question is of such a nature, and the article under notice so fraught with falsehood and malignity, that it requires some closer notice, as well for the sake of that part of the public who take an interest in such matters, as of the disappointed, infuriated, and demented creature by whom the article has been written. Who he may be is a matter little worth inquiring into; but every thing that he says, in as far as it tells at all, is made to tell so outrageously in favour of Mr. Cockerell, and often melts into such gross flattery of that gentleman, that the reviewer is evidently a strong partisan of Mr. Cockerell, who, in an unguarded moment, appears to have allowed him to give to this reviewer, information which would have been much better withheld. It behoves talented men of all classes, and more especially artists, to be extremely cautious in whatever they say of those who are their rivals, more especially their successful rivals; for, as in the case of this reviewer, malignant parties may so dress it up as to make it apparently come from the artist, even though nothing could be more repugnant to his feelings.

Had we been disposed to degrade ourselves to the same level as the reviewer, we might have insinuated, or even broadly asserted, that Mr. Cockerell, or his friend at his instigation, wrote the review; for it is therein said expressly that the articles on the Royal Exchange in our journal, especially the article for last October number, were written by Mr. Tite's friend at his instigation, or by Mr. Tite himself. Now, the article in the August number is a simple narrative of facts, not bearing very expressly on the merits or demerits of any piece of architecture; and, as such, might have been written by any body without the possibility of giving offence. The paper in the October number, again, was not written by a friend of Mr. Tite, or at his suggestion in any way; and, therefore, for whatever it contains, the author and the author alone is responsible; and we believe him to be a gentleman incapable of giving any other than his candid opinion, whether others may think it right or wrong, and also fully competent to defend upon good and solid grounds, any opinion which he may give. We do not believe that there is in

the whole paper the slightest indication of any partiality for Mr. Tite; and had we found in the paper now under our notice, the same with regard to Mr. Cockerell, we should have been silent upon points whereon we now feel ourselves at perfect liberty to speak out.

Before we notice these and the other and graver points requiring our comment, there are two little preliminary matters respecting which it may be as well to say something:—First, the channel in which the paper makes its appearance; and secondly, a certain plaything which the reviewer has got, with which he seems already to have hurt himself a little, and is likely to hurt himself more if some charitable person does not take it from him.

The paper appears in the Westminster Review. All our quarterly reviews are understood to aim at being the organs of certain political parties, with which of course we have no concern. The Westminster Review is pretty well understood as being the organ of a very small and peculiar clique, so profound in ultra-liberality that they have fairly got through the bottom, and of course see every thing the wrong way. This appears to have been the chief enticement which there was toward the Westminster; because their mode of reviewing matters agrees with that of the present reviewer to a very tittle. So much for the *locus in quo*.

As to the dangerous plaything, we shall, perhaps, best enable our readers to understand and appreciate that, by telling them a short story.—Some years ago there was, and for aught we know there may be yet, within less than twenty miles of the Royal Exchange, a tempting white cottage, peering through trees, and displaying in golden letters the following announcement,—"Miss Rebecca Rowbotham's Establishment for be-walloping the genus of Young Gentlemen." This good lady was a notable in her way; and if she is still above the ground, we would earnestly recommend the Westminster reviewers to find her out; as she would run beautifully in a curricle with some of the she clique already on hand. But to our purpose. Miss Rebecca had various modes of pactising her be-wallopment.

Among the rest, she used periodically to take her young gentlemen to the toy shop; not a mere collection of tops, hoops, bats, and balls; but of implements used in various arts, rural and civil, not quite sham things, but something intermediate between the toy and the real implement.

Among her young charge, there was one wayward boy, who had been taught at home to believe that he possessed uncommon abilities; and on this account he took so pert and forward a position among his fellow scholars, that he was known by the *nom de guerre* of "Cockie." In military prowess he was certainly not the cock of the walk; for when at a distance from the school, he had been once and again thrashed by boys considerably smaller; but, somehow or other, he had won the favour of the mistress; and thus he was lord of the ascendant, both in the school-room and on the house play-ground.

One day, there had been a new be-wallopment, of what kind is not said; and the prize to the chief expounder of it was a sugar plum. Cockie tugged away might and main, and made blunders and faces and all sorts of things, in order to make sure of the sugar plum. It would not do, however, for another boy, who had made no noise or grimace about the matter, was so very superior to him, that the school gave their award by acclamation; and Miss Rowbotham had no decent alternative but to follow their example. This brought a gloom over the visage of Cockie not easy to be explained, and during the short time longer that they remained in the school, he seemed to be put to no easy shifts to prevent the wrath which was turmoiling in his bosom from belching forth like an eruption of a young Etna.

They were soon ordered to the house play-ground, there to exercise themselves with their implements, as each best pleased; and with the single exception of Cockie, they went forth joyously, in great part excited by the boy who was their prime favourite having got the sugar plum. We should have mentioned it before; but it will do even now, that when the implements were selected, Cockie's choice was a flail, not above half the size for a thrasher, but capable of giving a very tolerable thump, if placed in hands that knew how to use it. The owner of this flail had never used it in any way; and thus he was quite ignorant of its management. Now a flail, in the hands of one who knows nothing about it, is a very awkward kind of instrument; and simple though the operation appears when we see a man thrashing, there is yet something in the management of the flail, which not even an Architect could acquire by all the book-learning and all the foreign travel in the world.

Cockie was determined to work off his indignation with the flail that day, and give a bang wherever he had a dislike; but more especially to the boy who had got the sugar plum. In order that he might do it with the greater safety and effect, he posted himself behind that boy, and within flail's length of him; and when he had done so, he rested on his flail until such time as the eyes of none of the other boys should be upon him. This lucky moment as he fancied came; and so, grasping the handstaff with both hands, he hit out toward the boy with the upper end of it, never doubting that the thrashing-tree would swing out and do the execution which he desired; but for want of knowledge he had no command over the tree; and so, when he hit out the top of the staff, the end of the tree swung backwards, and hit himself souse in the chops. An urchin who had been close by, and watching unobserved all the time, set up a shout of laughter when the blow told with such effect on Cockie himself, and the wrath of that hero waxed greater. He struck at the laugher in the same manner as he had done at the boy that got the sugar plum, and the disobedient tree repaid him with a hearty bang on the sconce. The boys now began to collect and form a ring around him, shouting and hollooing in a paroxysm of glee: he kept his place and his anger, and aimed his blows by turns on all sides, increasing their force with the increase of his own anger and agony. For such was the home inclination of the thrashing-tree, that every blow told on his own cranium, and not a few of them to the effusion of blood; and though he persevered for a considerable time, he was always sure to hit himself, but never could hit any one else. In fact, there never was such a be-wallopment of genus in Miss Robotham's famed establishment; and certainly, in the short space of a quarter of an hour, Cockie got as many bumps on the skull as would have served half the philosophers in Christendom. Such terrible warfare, and all recoiling on the head of the aggressor, could not possibly last long; and he at last brought himself to an anchor on the flail, placing it under his armpit and resting upon it, in order to recover his breath; but whether for the purpose of renewing the combat or no, is a point which the Fates leave involved in oblivion. While resting, he was a most woful spectacle, his face covered with mingled streams of blood, perspiration, and tears, his lips drawn wide apart, and his teeth set firmly together. The boys continued their shouting at his rueful aspect; until at last the sound of their merry voices

attracted Miss Rowbotham and a friend who was with her to the scene of the self be-wallopment.

We have said that Cockie was a favourite with the lady, and her first impression was, that the boys had attacked him en masse and had half-killed him; but they declared with one voice, and that so very candid a one as not to be discredited, that he had done it all to himself with his flail, while attempting to thrash the others, which he could not accomplish. He was instantly removed from the play-ground; the flail was burned; and he did not again make his appearance for a week or ten days, at the end of which time he was found to be one of the quietest boys in the school.

We do not say that the flail of the reviewer was anything like so formidable as the flail of Cockie; but even very little flails are ungainsome things, and will give pretty smart bangs to those who do not know how to use them. The flail here alluded to is the story of honest John Ballhorn, the printer of Lubeck. According to the reviewer, this Ballhorn printed and "amended" an A B C book. Of the emendations of the book itself he says nothing, but grounds his case that John Ballhorn is a fit instrument whereby he may insult his betters when he has no other ground for doing so, upon an alteration which John Ballhorn made on the cut which was usually appended to books in the 16th century. Originally, the device had been a game-cock with spurs, which was the most absurd emblem imaginable to put on an A B C book, inasmuch as the letters of the alphabet were never meant to teach or excite human beings to fighting. John Ballhorn was shrewd enough to discover the absurdity of this pugnacious emblem; and also how it might be "amended," and rendered quite appropriate, by means of the very same bird. This he did by showing that the grand object of the bird is to fertilize, and he judiciously placed the eggs as indicating a new generation. This accords beautifully with the first simple elements of learning, which are, so to speak, the germs of future knowledge; and thus, the emblem of John Ballhorn accords finely with its subject, in expressing productiveness and not pugnacity. And it is worthy of remark, that in every case where the reviewer alludes to something which he says Mr. Tite has appropriated from the designs of the others, and Ballhorned, Mr. Tite has, even granting the appropriation, invariably improved the subject, by turning it from a merely useless architectural flourish to that which serves a useful purpose. Hence, where he means to censure, he really praises in the most substantial manner; and bangs his own sconce with John Ballhorn, just as Cockie did with the unmanageable flail. We bear no manner of hostility to the reviewer; and, therefore, we earnestly advise him to let alone every subject that he does not thoroughly understand. This might, perhaps, narrow his range to a very few subjects; but though man is answerable for the use to which he turns his brains, no one is answerable for the smallness of the quantity, or the perfect inaptitude of that quantity.

As to the fact of the appropriation of any one part of any of the competition plans by Mr. Tite, we shall speak by-and-bye; but at the very outset his design—in our opinion the only good one, is described wholesale as being "a piece of patchwork, Ballhorned from Donaldson, Cockerell, Bunning, &c.," to which are appended some sentences too gross for the most low and profligate journal on the face of the earth. This wholesale denunciation against Mr. Tite's plan appears to have been made for the introduction of two different systems of abuse, according as the one or the other may best suit the phase of malignity under which the reviewer might be for the time. The sweeping charge of plagiarism enables the reviewer to follow the example of old John Dennis, the snarling but toothless critic. He wished to appropriate whatever writing he liked, which, being a small and very useless and insignificant portion of our literature, he might have had without loss to anybody. In addition to this, however, he wished to lay claim to other things: among the rest a new mode of making theatrical thunder was introduced during the days of his dotage, which occupied a very indefinite portion of his life. The old way was by means of the mustard-bowl and the small cannon shot, so that when it thundered in the theatre the manager had always fresh mustard for supper. But, about the time alluded to, some terrible thunder-and-lightning pieces were introduced upon the stage, and it was found impossible to make the thunder near and sharp enough by the hollow rumblings of the mustard-bowl. Sheets of tin plate were accordingly used; and the first time that the sound of them was heard by Dennis, he bolted to his feet and roared like a Stentor, "'Sdeath! this is my thunder;" and just so, by means of his sweeping charge at the commencement, the reviewer has reserved to himself the liberty of bolting up and exclaiming "'Sdeath, this is my thunder!"—that is the thunder of the party whom I horse on my sturdy back, to Mr. Tite's whole design, or to any individual part of it.

In spite of this sweeping charge, Mr. Tite's plan was countenanced by all the committees, umpires, and others; and its graceful and substantial merits got the better of all the trumpery tinsel of the others. When several architects compete for a prize, especially a prize which has to be substantially executed for a comparatively small sum of money, the majority of the competitors are in general no better than nuisances. Judging from the conduct of the mass of the multitude, they pay far more attention to the prettiness of their designs than to their value when executed, or to the practicability of executing them; and, therefore, if such a competition were indefinitely open, and each competitor were to be paid for the something that he brought forward, then the whole affair would resolve itself into a sale of water-colour drawings, and the main object would be entirely lost sight of.

When the grand joint Gresham Company, with a party of the London Corporation, first issued their programme and invited competitors, the result was thirty-eight designs; but none of them understood to be from very first-rate architects in the city. The committee declined deciding as to the merits of the designs; and Sir R. Smirke, Mr. Hardwick, and Mr. Gwilt were appointed to adjudicate. These gentlemen, actuated of course by a desire of strictly performing their duty, rejected the whole of the thirty-eight, as unfit for the purpose wanted. They, however, commended Nos. 50, 46, and 27, as clever pieces of art;—that is, as well got-up drawings, though by no means suited to the intended purpose. We have heard, though we do not vouch for the fact, that no small degree of indignation was excited even at this early stage of the business, and that an attempt was made to draw the public, head and shoulders, into strife with the committees and the deciding architects. Some part of the administration appear to have had a slight feeling the same way, and they appear to have hoped that some assistance which they had rendered to the work would give them a deliberative voice, and even a veto in the selection of the designs. The opinion of eminent counsel was against them, however; and upon this they wisely resolved to mind their proper business, that is, to take care that the new building should not encroach on the public streets. The disappointed competitors, or some other parties who wished to make a cat's-paw of them for factious pur-

poses, still continued, in whispers feeble and far between, to bemoan that the public had not taken a part, and exercised an overwhelming voice in the matter. The majority of the designs passed pretty rapidly to the limbo of all that is vain and unprofitable; but there was a certain inhabitiveness about No. 46, the production of Mr. Cockerell, which made it haunt the place like a ghost. The judges had described this No. 46 as "an extreme case of impracticability of execution, and excess of cost;" but even after this it lingered about the threshold of the committee. Many efforts were made to bring it within that threshold, but they would not do; and a new competition was formed, in which Mr. Tite was the successful candidate.

Those who had fought the longest and the most toughly for the job, had now nothing to fall back upon but their own disappointment and chagrin, except that they had the benefit, if benefit it could be called, of such a scribbler as the reviewer under notice. There seems to have been great wrath, on the part of these disappointed architects, and probably it would be found to be pretty general among the London public, if they troubled their heads at all about the matter, which does not appear to be the case. For even when the storm raged most furiously in its little nook, there was no petition from a single merchant, and no public meeting of the populace, prone as they are to assemble upon the most frivolous and unmeaning pretexts.

What was wished to be established, was, that the Exchange is a public building, and that on this account the whole public have a right to see and decide upon any plans given in for its rebuilding. Now, nothing can be more erroneous than this: the Royal Exchange is not a public building, but a private one, of which, according to the will of Sir Thomas Gresham, the personal trustees on his estates, the Mercers' Company, and the corporation of London, are joint trustees, and bona fide owners of the place during the time they are in office. At the first building, we believe some of the merchants of London subscribed handsomely to the work; but their subscriptions were purely voluntary, and gave them not the slightest shadow of proprietorship in the building. We are not informed how matters stood at the rebuilding after the great fire, but we suspect that every man had quite enough to do to get the better of his own private calamity; and in the present case, no merchant or other inhabitant of London has, we believe, offered a single stiver toward the building of the Exchange.

The Exchange, is, as we have said, a public building; but it is a public building of sufferance, and not of right. The merchants attend at such times as seem meet to the committee of management, in terms of the will of Gresham; and while the merchants are there, if decently dressed and orderly in their conduct, the public are suffered to use it as a thoroughfare. But whenever the committee of management see meet, they may, if according to the will, turn out all the public and merchants, and shut the doors of the building. It is to be borne in mind too, that it is only the great hall, or court, or whatever else the rendezvous of the merchants may be called, to which they have this kind of admission. All the let parts of the building are as sacredly the property of the lessors as any tenements whatever, either in town or country; and these are the valuable parts; because it is the profits of them which enable a place of meeting to be supplied gratuitously to the merchants. For the public to arrogate to themselves any title to judge of plans for buildings, or anything connected with the Exchange, is therefore quite as absurd as it would be for the rabble rout to come upon the grounds of a nobleman, and compel him to build or alter his house according to their notions of taste and propriety. We do not think that even the indication of such a doctrine could have dribbled from the pen of any one but a Westminster reviewer; and it would take a vast deal of evidence to convince us that Mr. Cockerell ever entertained the opinion for a moment, or sanctioned, or even knew of, its appearance in that obscure print. The Gresham Committee, the committee of the Mercers' Company, and a committee specially appointed by the City corporation, are the proprietors of the Exchange. In case of its being burned down, they may build it in what fashion, and of what materials they please. It may be a plain brick barn, or a splendid hall, such as that proposed by Mr. Tite's plate; but whether it is the one or the other, or something intermediate, or worse, nobody has a right to complain; for, if they do not like it they may leave it, and find a place of meeting more to their minds. These few sentences, which are very plain, and as true as they are plain, may perhaps assist in putting some people to right upon a question respecting which there has been no little misunderstanding, and might have been a great deal of wrangling and ill-blood, had it been of much public interest. We have now to proceed to the last branch of our necessary, but somewhat irksome and inglorious, task,—namely, a short examination of the reviewer's estimate of the comparative merits of the three plans by Mr. Donaldson, Mr. Cockerell, and Mr. Tite,—the reviewer's object in which appears to be to make Donaldson a sort of tool for the aggrandizement of Cockerell; and turn both, and anything else he can rake up, into a means of traducing and slandering, and, if possible, ruining Mr. Tite. This of course can be the work of none other than the Westminster reviewer, and what he may propose to himself by it would be no easy matter to divine.

Finding the reading of this part peculiarly dry, in consequence of the clumsiness of the style, the total want of logical connection, and the frequent violation of truth, we did with it what we believe most people do with bad writing; we took a glance at the pictures, to see if their fulness and freshness would atone for the pitiful meagreness of the pages. But, alas! our transition was from the river to the raging sea; and though, upon afterwards grappling with the writing, we found these pictures a very correct index to its spirit and purpose, yet the coincidence was anything but pleasing. If the three designs which form the subjects of these pictures had been to be compared in a fair and regular manner, the same number of representations ought to have been given of them all, and they should have been placed in as close juxtaposition as possible. Instead of this, however, perspective representions of the west fronts and Cornhill flanks of the drawings of Messrs. Donaldson and Cockerell are given in all their details, and upon tinted paper. For that of Mr. Tite we look in vain, except in a fragment on a wood-cut at page 80, badly drawn, worse engraved, and still worse printed; and though an eye of discernment can see the superiority of Mr. Tite's plan, even from this wretched scrap, it is gross injustice, both to the parties concerned, and to him, to see his plan so unfairly dealt by in comparison with the others. The interior is given only for Mr. Cockerell's plan; for it seems that Donaldson's front view has been thought enough whereupon to ground a case for establishing its inferiority to Mr. Cockerell's; and Mr. Tite's interior is so much better, that it would have been dangerous to bring it forward.

Then, as to the ground plan and plans of the principal story, great care is taken that they shall not come into juxta-position;

for though, in one of the plates, the principal floor by Mr. Cockerell, and some floor or other by Mr. Tite, are given, yet the details of the latter are not worked out, and one does not know what it is. Cockerell's is given in another plate, with considerable elaboration of detail, but some parts of it are so managed that one cannot make them out; but whether this is intentional, or merely arises from the clumsiness of the lithographic drawing, we shall not take upon us to decide. Of Mr. Donaldson's design no plan of a floor is given: this was not necessary to serve the purposes of the reviewer, which are obviously to extinguish Mr. Tite, to put Mr. Donaldson hors de combat, and thus exalt Mr. Cockerell to the position of the greatest architect upon earth—except himself.

From these most garbled, partial, and unjust graphic delineations we turn to the letter-press; and we wish we could say, that we return to it with a little more satisfaction: such is not the fact, however. The tout-ensemble of Mr. Donaldson's design is praised, and represented as the type of that of Mr. Tite. The praise is ill-bestowed, and the comparison is not true. Mr. Donaldson's design is a light and airy building, certainly; and as it is almost entirely Corinthian columns, with a blind attic over in every place but the portico, it is certainly made up of classical parts; but it is flimsy; and the ornaments are tawdry. At the centre and side angles of the pediment there are groups of figures on blocks, which appear to be placed there to keep them out among the cats' feet, and for no other object. The pediment is filled with sculptures of sea-horses and other non-existent monsters, which have no business on a decent building of the present day; the return cornices of the pediment are also beset with antefixæ; and there are small baubles stuck upon other parts of the building. If, as has been said, this design resembles the Medici Venus in its delicacy, then she has been sent for many long moons to the king of the Cannibal islands in order to be tattooed.

One of the greatest faults, however, consists in the open colonnades, ten feet wide, which run along the Cornhill and Threadneedle street, and much narrow the area at the very place where breadth is most to be desired. In his own report Mr. Donaldson passes sentence of his design, as wholly unfit for a Royal Exchange. He says, "The object of the author of this design has been to produce an edifice of a truly monumental character, conceived in the spirit of antique taste, and at the same time combining with its classical appearances the various conveniences required by its destination." Now, with great deference to Mr. Donaldson, this is a combination which no man can effect. The kind of buildings from which it is copied are perfectly useless ones in a modern point of view, and, therefore, all that is purely classical, is useless for Exchange business, and all that is useful for that cannot be truly classical. The portico if denuded of its trifling ornaments might do, though it is too deep for the portico of a useful building; but the lateral colonnades are eyesores, besides being useless—for any other purpose than that of collecting idle boys to interrupt the business of the shops. After the reviewer has said as much about Mr. Donaldson's design as serves his own purpose,—that of bringing a charge of wholesale plagiarism against Mr. Tite, he also turns it over as wholly unfit for the intended purpose: he admits the external classicality, and the monumental and antique grandeur, or, as the reviewer most ludicrously terms it, the "*Temple*" style. But he does not consider a Greek temple as at all suited for an Exchange, or any other civic building. In all this he is, once for a wonder, about right. But he immediately turns round and directs his popgun against the Post-office, which, abating a little of that sombre and sullen grandeur which Smirke is apt to introduce, is among the finest, if not the very finest building, in all the Metropolis.

We must now proceed to that branch of the comparison in approaching which we have certain feelings of reluctance, because, though Mr. Cockerell certainly does not speak of his design in terms of such stilted and exaggerated praise as the reviewer, yet he does speak of it, and evidently likes it, because he challenged Mr. Tite to a comparison of models, after Mr. Tite's design had been approved of in the plans. First, let us hear the reviewer: "In our opinion, the style selected by Mr. Cockerell best reconciles the claims of metropolitan magnificence and commercial uses. It is neither fronted like an ancient temple, nor flanked with thin slices of Regent street. It is grand and imposing in its larger outlines—civic and sumptuous in its character and its details. The introduction of three stories of honest windows in all his fronts, and the manner in which he combines, throughout, such business-like parts of his edifice with rich and varied architectural decoration, seem to us very masterly. Every member of his structure has its use or meaning, as well as its beauty. With all its richness, there is no tawdry or frivolous ornament; and no space wasted, with all its regular form and picturesque effect: there is no lying pretence on the exterior of his edifice; but the external indications correspond with the arrangements within, and unity of design is preserved in a very remarkable manner, amidst multiplicity of detail, and despite an irregular ground. We may appear partial in our description of this composition—and, indeed we are so. We think it is the best Palladian design we have seen since Sir William Chambers." p. 70. These words drop like honey from the rock, and oil from the flinty rock, upon the anointed head of the reviewer's idol; and we ask whether it is not enough to break the hearts of gentle critics like us to be constrained to say, that there is not one word of truth in it; and we know not how much we are indebted to the reviewer for introducing the profound anti-climax of Sir William Chambers, and thus rendering our descent as easy as possible. Before making any observation of our own, it may be as well to quote a portion of Mr. Cockerell's own description, as he must be supposed to understand more about his own work than any body else can do: "The whole," says he, "is uniformly surrounded [*surrounded* is the proper word,—because, what is alluded to is about the design, but not of it,] with a Corinthian order, 49 feet high, upon a stylobate 5 feet 6 inches; and with a subordinate Doric order forming that [that *what*?] of the interior portico, and occasionally displaying its entire proportions externally, sometimes enclosing arches, sometimes the ground-floor windows and mezzanines, and sometimes, as in the grand western entrance, forming the impost of the great archway; but uniformly throughout designating, by its bold Doric entablature, the floor of the principal story. The union of two orders was frequently practised by the ancients, and was one of the great secrets of Palladio's success; indeed, this composition has been mainly formed on the model of his mayor's palace at Vicenza. The connoisseur will also recognize in it the models of the Stoa of Hadrian at Athens, and the triumphal arches, and the Forum of Minerva at Rome. The Corinthian order was chiefly employed by the ancients, and indeed is so by the moderns, for civic and municipal buildings, on account of its greater magnificence, and because, the proportion of the height to the diameter being greater, it was more convenient in the distribution of the plan.

"The west front, from being seen at a distance of 500 feet, demands the greatest study; in this, the triumphal arch has been

expanded, and, as it were, rendered habitable by floors. The principal and subordinate archways are separated by six instead of the usual four columns of the Roman arch, and they are wholly disengaged from the building, as in those examples. They are surmounted by the Four Quarters of the Globe, together with South America and Australia, which the recent cosmic [cosmographic] arrangement has admitted into honourable participation. At the back of these rises an attic 12 feet high, making the whole 61 feet high; upon this, the 12 principal companies or corporations of London have their armorial bearings: below is a dedication to her Majesty the Queen. The great rivers of the world repose upon these and all the surrounding arches, after the manner of the famous arched porticos of Venice.

"In the south front the order projects in three-quarter columns, and in the north in pilasters: four niches [in what part of the building?] containing statues of Sir Thomas Gresham, Sir Hugh Myddelton, and other worthies of London, [who are the remaining two? Whittington possibly for one, and his cat for another]; the Dragon of London, the Arms of London, and the Royal Arms and the Gresham Arms, decorate different portions of the building. The length of unbroken cornice in those lateral fronts is 161 feet, a longer unbroken line, I believe, than any building in London at present displays. The fashionable amateurs of the day, therefore, who consider the unbroken line, in imitation of the Temples of Greece, and some of the palaces at Rome, to be the grand nostrum [nostrum!] of architectural beauty will not be disappointed. On these sides, the subordinate variety of Doric porticos, doors, windows, and arches, will be found conformable to the rules of taste as well as of convenience.

"The large openings calculated for the shop fronts are confined to the east end, in the arcade; the dignity of the edifice will be best consulted by windows in the three principal fronts, like those of the Treasury in Somerset-house; its character will be thus more official, will compete less palpably with the shop property in Cornhill, and the nation boutiquière will not be betrayed so obtrusively.

"Towers cannot be deemed unbecoming a building of this description, especially when the necessity or propriety of one at least seems agreed on all hands; the loss of St. Bartholomew's tower, as well as St. Benet's, about to be removed, will be much missed [the loss will be missed, will it!] in the architectural views of this part of the city; there seems, therefore, a necessity for such a compensation [as what?]: in so long a front, and in so confined a site, vertical features will be found to be of great value. At the height of 54 feet from the paving, are 28 windows, containing 1,344 feet of light and sun's rays: these are supposed to be glazed. Above these, 80 feet high, is a cove, diminishing from 7,250 to 3,367 feet." pp. 73, 74.

"O that mine adversary had written a book," exclaimed the man of Uz, when in the depth of his calamity, and under the unjust obloquy of those he had served: but Mr. Cockerell is no enemy of ours. On the other hand, we have the most charitable feelings and the greatest bowels of mercy toward the gentleman, and consequently our exclamation in his case is, "Oh that Mr. Cockerell had not written a book!" for we fear there is enough contained in his own writing, to show that his design is unfit for a Royal Exchange—or for any thing else.

We shall take it first at the greatest distance, because there are many things of which this is the most favourable view. Well, suppose we lift up our eyes at the distance of 500 feet, and behold the west front, upon which such enormous expense would require to be lavished, in working out a something, which is yet nothing definite after all. The leading idea is certainly that of a gateway—a Roman triumphal arch if you will; but when one comes a little nearer, one finds that if ever it has been a triumphal arch, the triumphs are gone, the arch not wanted for its original purpose; and so it has been eked out to an additional column on each side, raised in height, and windowed in the most common style, so as to fit it for an ordinary dwelling-house.

A little nearer still, and what are called the ornaments make their appearance. The nightcap, the monsters, and the red cross shield, occupy the higher and central part, and have, piously carved below them, that prayer which is so necessary for all good citizens. Then immediately below, and each supported by the top of one of the pillars, and appearing to be the only thing which that pillar supports, are the figures which are emblematic of the four quarters of the globe, of South America, and of Australia. We are not acquainted with those "Cosmics" who have seen the necessity of making the world six quarters wide; but they seem to have known something of the late facetious Doctor Barrett, of Trinity College, Dublin, who translated the first sentence of Cæsar's Commentaries, "All Gaul is *quartered* into *three halves*." Their division of the globe into six quarters wants the wit of the translation, because it is not every day that one meets with a Dr. Barrett; but, certainly, if the Doctor had been in earnest, which he was not, they would have beat him in absurdity. These six quarters of the world are nothing but six female figures, the carving of which would cost a great deal of money, and they would be useless and even ugly after they were done. One sees quite enough of city emblematical sculpture in Guildhall; especially in the monument of the elder Pitt, which is not very seemly to look upon. Emblematical sculptures are not even tolerable in these days, unless so exquisite as specimens of art, that the world overlooks, on that account, both their mental and their moral improprieties. How a row of six figures of women are to be made emblematical of the six quarters of the world, is more than we can divine; and though they were ever so emblematical, such tawdry conceits are unworthy of the Royal Exchange of London, where merchants from all parts of the world are understood to meet as one brotherhood. The great rivers are shadowed forth by lanky figures, reaching from the spring to the crown of the arches; but whether they are furnished with jugs to hold the water, as is usually the case, the lithographic print is too poorly executed for informing us. There are other two sculptured ornaments, if ornaments they may be called, which deserve a notice. They are two great beasts, placed upon projections from the bases of the second columns from the right and left of the front; and may serve to point that all between them belongs to the triumphal arch; but that the front beyond, having "honest" windows, like those of a common dwelling-house, is fit for being inhabited in stories.

In such a frontal exhibition as this there is no congruity, and not one bond of union, at least in the Corinthian part, or external integument. It is a sort of architectural mosaic, in which men of small minds may marvel at the number of bits; but assuredly, it in itself gives no idea of being connected with a splendid building, or indeed, with any building at all. If we go round and examine the façades, the feeling is still the same, namely, that this design for the Royal Exchange is a plain Doric building in a Corinthian cage; and one cannot help wishing to see the cage removed, in order to

get a glimpse at what the building is in itself. What the east end may be we cannot tell, never having seen a drawing of it; but in the west, the south, and the north, the windows and all the details are made to agree with the Doric, so that the Corinthian part of it is merely useless garnish, and obviously so, even to a very common observer. Yet this is the structure of which the Westminster reviewer says, that "there is no lying pretence on the exterior; but the external decorations correspond with the arrangements within, and unity of design is preserved in a very remarkable manner amidst multiplicity of detail, and despite an irregular ground,"—he might have added, "and the most regular conglomerate of incongruous parts that ever made its appearance in any quarry upon earth." But, as we have already had occasion to say, one cannot believe a single word penned by this reviewer. One thing we may mention: Mr. Cockerell takes great merit for making the shops on the north and south sides as unshop-like as possible, which he in part does by means of his "honest" windows, which a chandler in a very humble street would be ashamed to own. Now, if there actually are shops,—and it appears that without shops there could be no funds,—they should be made as shop-like as possible, and for most trades a magnificent window is a first requisite, without any inquiry as to whether such a window be "honest" or not. Another curious matter is that of the four towers, or rather pepper-casters, which are stuck upon the four angles of the principal building. They and their supports further break down the design into fragments; and we know of nothing worse, excepting, perhaps, the four pins set upon St. John's Church, Westminster; and even they have an air of some utility about them, because they might serve to rock the church like a cradle, in case the congregation could not be got to sleep by any other means.

But we are sick of this subject, and, therefore, we turn to that of Mr. Tite for a little of the pleasure of repose. There are some of the particulars into which we cannot enter, as we are not sure whether they are or are not finally settled, and we wished to make no inquiry of any person, either previous to or during the writing of these pages. It will be remembered that the reviewer accuses Mr. Tite of having copied from others, and spoiled in the copying, the whole and every individual part of his design. But, at least as far as the external part goes, they are all copied: and the grand advantage which Mr. Tite possesses over the others is, that he has copied with more judgment and combined the parts with more taste. The consequence is, that the beauty of his design consists in the unity and harmony of the parts; and their perfect keeping with each other in adaptation to situation and purpose. The grandeur of it is intellectual, discernible, perhaps, but by few men, and not by many artists; and this beauty it would retain although there were not a single ornament about it. Most of the others are designs *ad captandum vulgus*; and if you take away their ornaments or garnish, as we may say, they are as loathsome and unshapely as the bones of a dead horse on a common. For instance, take Mr. Cockerell's front veneering, and strip it of the London arms, the six quarters of the world, the great rivers, and the lions, and nobody would look at it. Mr. Tite's has very little ornament; and though we do not think that an addition would much improve it, but rather the reverse, it would admit of a large quantity if duly distributed. In every point of view, Mr. Tite's design is "*the*" New Royal Exchange; but we have no wish, and no need, to volunteer ourselves as his champions; and, therefore, we take leave of the subject.

CONFLAGRATION IN DUNDEE—OPPORTUNITY FOR IMPROVEMENT.

When the great Lord Kames, in his younger days, went on the circuit of assizes as a barrister, there was one occasion upon which the puckered-together countenance and pert bearing of a witness struck him very forcibly. He had to cross-examine this witness, and his first question was, "Pray where do you come from?" "Dundee," replied the man. "Why what on earth could make them so stupid as to bring a person from Dundee to be witness in a court of justice?" "Ay, but I was born on Lunan water though." "That quite alters the case," said Kames, "and we may make something of you; but if you had been born in Dundee, our time and labour would have been lost." Such has been, and such is likely to be, the essence of the Dundee character. They are a snarling, wrangling race, without any regard to politics; and, in consequence of this snarling and wrangling, they spoil every thing that they undertake. Is a public building or structure of more than ordinary cost to be erected, then they wrangle about the situation until they can fairly set it down where it bars the practicability of a thoroughfare, which would be highly beneficial in the way both of accommodation and of health. Is a plot of ground to be built on, either in freehold patches or in perpetual copyholds, which is the usual suburban tenure in that part of the country, then the houses are sown broad-cast, as it were, facing all the winds of Heaven, but no two which are nearest each other facing the same. The farmers of the neighbourhood understand drill farming very well; but the people appear to have an inherent dislike to drilled houses; for, ample as are the additions made of late years, there is not one decent street or row in the whole. It is the same with every attempt at public improvement. From the nature and natural beauty of the ground which it occupies, Dundee might be one of the cleanest and handsomest towns in the three kingdoms; but such is the prying disposition of the inhabitants, and their desire to see everything, that when a smart shower of rain falls, the *Jetsam* and *Flotsam* of the higher parts of the town rolls down the shoreless streets, for the gratification of the optics and olfactories of the dwellers in the lower, who stand rubbing their backs against the door posts, and snuffing up the balsamic hugue like so many wild asses in the desert. Things may be a little altered now; but such was the state of them many years ago. If a public improvement has to be made, they are always sure to bring forward the case and the cudgels at the same time, and love of the cudgels most generally makes them mar the case. A master-stroke was once made in the getting of an excellent harbour, instead of the former place of abominations, where the vessels were half up to the gunnel in the most offensive ailt at low water; but this was obtained for them by strangers, backed by the gentlemen of the county, who got Dundee thanks for all their arduous and gratuitous exertions.

After this, they brought in a project for supplying the town with water; and many journies were made to London for this purpose; but the wrangling disposition marred the essence of the project; there is a very scanty supply for the ordinary wants of the inhabitants, and in the case of a fire, there is little or none to be had.

A remarkable instance of the evil of this occurred on the morning of Sunday, the 3rd of the present month of January,—the same morning when so violent a thunder-storm visited England, and the lightning shattered some churches there. The original parish

churches of Dundee were four in number, consisting of the nave, the transepts, and the choir of what once was the church to a very rich monastic institution. The only part of the ancient building that remained, and still remains, is a great tower of Norman form, but more recent architecture; and judging from what remains uncorroded by the weather, it has never been in a very high degree of taste. The nave is occupied by a substantial but very tasteless barn-looking building, of very recent date; and this, together with the tower, remain unscathed by the conflagration. The south transept was occupied by what was called the South Church, and the north transept by the Cross Church, two buildings of the most tasteless character. The choir, or old church, was a little older, though still of very modern date, as was proved by some of the walls being founded upon the recumbent tomb-stones of those who had been at the crusades, an occurrence which is not likely to have taken place till long after these chivalrous adventurers were forgotten. In this church, there was a sort of apology for pillars and arches, but both were in the most uncouth and homely style. These churches have of late years been heated by flues; and an excess of heat on the morning in question, or very late the evening before, had set fire to the wood work, which the usual bungling of those in authority had left without sufficient protection against such a casualty. When the fire was first discovered, it had gained so little head, and was so accessible, that it might have been extinguished by a few pitchers of water, and scarcely any damage done; but there was no water to be had, owing to the parsimonious supply; and thus the three churches blazed away until they became one mass of ruin. The loss will fall upon the public, or rather on the common funds of the town; because they are the property of the magistrates, and generally under the management of a grave and solemn member of that body, who is known by the official name of "Kirk-fabric."

The burning down of these churches has given those in authority the means of extending, at very small expense, a fine street from the harbour straight to the landward side of the town; and we have been informed that some gentlemen of taste and engineering talent —not natives of Dundee, of course—have caused this and the mode of carrying it into execution to be laid before the wise men of the town. But it seems there is a trace of the leaven of popery running through the rank presbyterianism of Dundee; and they are up in arms at the idea of desecrating the holy ground. This is a little singular, as they did not use to be very particular in taking a tomb-stone which was too old for any body owning, and placing it as a foot-bridge across the gutters at their doors. It seems, however, that the piety of such parties runs in one way when their own interest is concerned, and in quite another when the public good is the object. There are many beautiful situations for churches in Dundee, and the straggling character of the town demands that they should be dispersed as widely as possible. But, notwithstanding this, the three barns will no doubt be patched upon their old sites; the people will have to trudge a mile or two to church; and the fine street, for the completion of which there is now so favourable an opportunity, will be lost to the public—now and for ever. Such is one instance of Dundee engineering: the whole history of it would make a most curious, and by no means an uninstructive narrative.

TO THE EDITOR.

SIR,

IN the month of August last, there appeared in your very useful Journal, an article headed "On the practice of Land Surveying, more particularly Parish Surveying," and having the initials E. I. at the end of it; but in the entire phraseology thereof, bearing the official impress by the use of the mighty and all-potent "We."

This writer (without note or comment from yourself) is made to say "In Land Surveying, *the* RULE *of* PRACTICE is to obtain a SURFACE, the CONTENTS of which shall be *equivalent* to the HORIZONTAL AREA, although this (the actual) surface in hilly, and particularly in mountainous districts, is much greater than the horizontal area in extent."—The writer afterwards endeavours to show, by the help of a wood-cut, that the hilly surface is not more productive than the horizontal base beneath the same hill would be.

In your number for this month, there appears, without any initials or name, an article "On the measuring or plotting of a hill," wherein the writer says, "A question has been raised as to the comparative value of the surface of a hill and the level base upon which that hill stands; and as *Ignorance* always prefers that which gives it the least trouble, the vulgar conclusion is that both are of the same value." After another charitable repetition of the great ignorance of the previous writer, the scribe in your December Journal proceeds:—"No general ratio can therefore be established between the actual surface of a hill and the base on which that hill stands. It must be decided upon the circumstances of the individual case; for we have known many instances in which one acre of the hill was worth many acres of the morass and quagmire around its base; and as many in which one acre of the fields or meadows at the base, was worth several acres of the hill." This argument (on the relative values of the land forming the hill and around the base), *where the question is horizontal area or surface area*, may be very conclusive reasoning in the mind of the writer; but I candidly confess, to my obtuse comprehension, it seems not to be at all pertinent.

The writer goes on thus: "The CONSCIENTIOUS SURVEYOR will therefore return the *actual surface, whether plain or sloping, as the area*, but he must in all cases get at the base for his plan." If the Surveyor must in all cases get at the base for his plan, I wish to ask in what way the plan itself is to be made available to cast up the area form, as a check upon the accuracy of any previous computation, or for any other purpose whatever, if the conscientious Surveyor must follow the dictum of your "umbra sine nomine," and return the *actual surface, whether plain or sloping, as the area.* This gentleman, if measuring and mapping a township or parish through which any railway passes, with a very lofty embankment, would of course (to be consistent with his own doctrine) return the measure of the slope on either side of the embankment and along the roadway or the surface area thereof, as the quantity of land occupied by the railway; but plot the base of the embankment on the plan, and proceed in a similar way with the slopes in the deep cuttings! The same method he would no doubt follow (to preserve his consistency), in measuring the lofty embankments of the reservoirs formed on the streams and rivulets in the various manufacturing districts.

After announcing the astounding intelligence, that it is an admirable time for studying geometrical figures when "lying in bed not asleep," the writer proceeds to the measurement of a detached hill with nearly a circular base, for the purpose of plotting

it with perfect accuracy on its base; and after unfurling his *banderols*, (does he mean bannerol or bandroll?) with which he seems well laden, he proceeds in a very nice way no doubt to point out the mode of accomplishing this desirable object; but, as surveyors so very seldom meet with "a detached hill with nearly a circular base," and if they did, might meet with the greater portion of them *pretty* THICKLY WOODED, or the surface divided into a number or multitude of figures by fences; I wish to be informed, for my edification, in what way your correspondent (without ignorance) would accomplish the object in that case; and should also (at the same time he communicates the information,) feel happy to see a specimen of the field-book he would use to plot his work from.

A word with respect to the mode in which each of the articles alluded to is written. It appears to me, that in writing articles on a subject similar to this, there cannot be the least occasion for the actual name of the writer appearing, but simply some initial or assumed name; and that the subject should be discussed by each individual using the singular number; for by adopting the use of the pronoun "We," the writer obtains by "a very common but very absurd error," a sort of official sanction to the arguments he adduces in the discussion of the subject; notwithstanding they may be the conclusions that the vulgar and ignorant prefer, viz. "those which give them the least trouble."

I am, Sir,
Your's obediently,
December 14*th*, 1840. MENSOR.

[The article in question was written by a Surveyor.—COND.]

STEAM COACHES ON TURNPIKE ROADS.

OUR attention has been called to this subject, by the advertisements and prospectuses of a new Company formed, under distinguished patronage, to carry into effect this long-desired mode of conveyance. We need scarcely inform our readers that this project has long occupied the time, and exercised the ingenuity, of some of our ablest mechanicians; nor that the pockets of many an enterprizing capitalist have been drained in vain attempts to realize the *philosopher's stone* of steam conveyances on common roads. Gurney, Church, Hancock, Maceroni, and a host of others, have been for years engaged on the subject, and as long back as the year 1831, a committee of the House of Commons reported, "*that steam carriages could ascend hills of considerable inclination with facility and safety—that they were perfectly safe for passengers—that they would become a speedier and cheaper mode of conveyance than carriages drawn by horses—that, with the slightest exertion, they might be stopped and turned under circumstances where horses were totally unmanageable—that they would not act so injuriously on common roads as the feet of horses—that the substitution of inanimate for animal power in draught on common roads is one of the most important improvements, in the means of internal communication, ever yet introduced; and its practicability had been fully established.*"

But, nevertheless, steam coaches do not yet run as stage coaches, on the turnpike roads of the country, and, notwithstanding the undoubted practicability of thus using them, they are still almost as far from being so used as when the above report was made. And why is this? Why does an improvement of the greatest public importance thus remain in abeyance, when the operation of railroads on our internal correspondence renders so necessary the adaptation of the powers of steam to those cross-country communications which no railway can or will provide for. The answer to this question is, we think, to be found, not in the character of the invention, not in the want of perfectability in the steam coach, but in the apathy of the public, who, till lately, were so deeply infected with *railroad-mania*, that no other mode of conveyance stood the slightest chance of success or patronage. This mania has now somewhat subsided, and we trust that the advantages of steam coaches for travelling on common roads will be fairly tested, and as they merit, supported or condemned.

These advantages are fairly enough stated in the prospectus of the GENERAL STEAM COACH COMPANY, now before us, "to consist in *safety*, *economy*, *convenience*, and *expedition*." The first and most important of these essential qualities, safety, has been proved on the evidence of the most eminent and competent witnesses; and the melancholy proofs of the dreadful liability to accident to which we are exposed on the best conducted railroads, make us naturally turn to other modes of conveyance, which should unite *safety* with a high rate of speed.

Without the chance of danger, the steam coach travels at fifteen miles an hour, and it may be fairly doubted whether an additional speed of five or six miles an hour is worth purchasing at the risk of our lives and limbs. The management and working of a series of steam coaches is much less expensive than that of an equal number of stage coaches. Fuel is less costly than the purchase, feeding, care, and loss of horses. The parts of a steam coach, being iron, wear less than those of a stage coach, which are of wood, and it is calculated that passengers can be conveyed by steam coaches at *half* the expense and with double the speed of a stage coach.

In facility of adoption, also, this system of conveyance presents still greater and more important advantages. England and Wales are traversed by 30,000 miles of road practicable for steam coaches, while railroads are constructed at an incipient expenditure of from twenty to fifty thousand pounds per mile.

Fully satisfied, then, of the positive practicability and undeniable advantages of this mode of conveyance, we are glad to see so spirited an attempt to carry it into operation. The consulting engineer, Mr. Lomax, of Queen Square, is a man of talent and energy, and not one to suffer the concern to languish under his auspices. He has recommended the directors to make their first start on the finest turnpike road in the kingdom, and we are assured that in two months steam coaches will be running daily between London and Birmingham.

SUGGESTIONS FOR AN IMPROVED MODE OF WARMING APARTMENTS.

TO THE EDITOR.

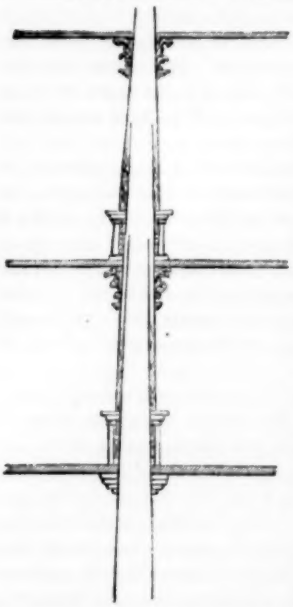
SIR,

IN the hope the following suggestions may prove interesting to some of your readers, I venture to request for them a corner in your valuable publication.

I am Sir,
Your's respectfully,
WM. HENRY V. SANKEY, JUN.

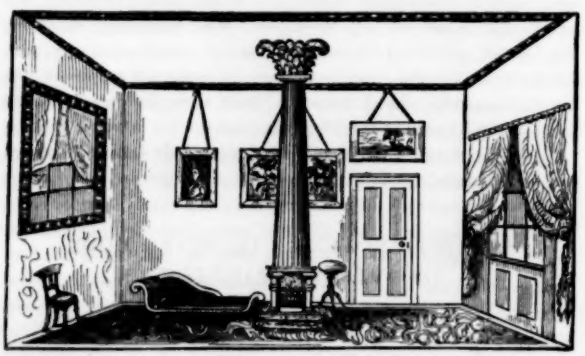
THE present system of building fire places in the sides of the rooms is attended with many inconveniences: in consequence of the unequal distribution of heat, the back of the chimney absorbing a great quantity of the caloric, the other walls of the apartment are

not sensibly heated for a considerable time; and, as a number of persons cannot have access to the fire at once, the benefit of the warmth is thus limited to a few monopolizers.



The plan I would propose, is, that the fire-place should be placed in the centre of the room, the chimney forming a species of hollow pillar. This would ascend through a series of apartments, one above the other, in the form of columns, as represented in the accompanying sketch, the lower chimneys communicating with those above, one inside the other, somewhat in the form of a telescope, as shewn in the section herewith presented. Of course the perimeter of the pillar would be larger in the basement story, and gradually decrease as it ascended through the building.

This would afford greater personal accommodation, contribute to the more general diffusion of heat, admit of a more elegant arrangement of furniture, and obviate the inconvenience of the present projection of the chimneys, so destructive to the uniformity and beauty of modern apartments. The position of the chimney in the centre of the room would answer admirably for Royal Saloons, Hotels, Lecture rooms, and Public Institutions, &c.—also for Dormitories in colleges and schools, where the space for beds is of so much value: in Dining-rooms, by adapting the horse-shoe



form of table, the guests would equally find the advantage of the genial heat, and it would be unnecessary to remove to the fire after dinner.

In the Kitchen department the advantages are obvious, as several joints might be roasting at the same time, and the haunch, the hare, wild-fowl, &c. be readily and conveniently cooked at the same fire.

As the chimneys will be straight all the way up, it will greatly facilitate the mode of sweeping by machinery, which must necessarily come into general use in consequence of the new act of parliament which prohibits the employment of climbing boys, and consequently will introduce a new construction in the rearing of chimneys.

Another advantage may be added to those enumerated above; should a chimney take fire, the danger would be confined to the house in which it originated, thus avoiding the risk so often complained of,—"Proximus Ucalegon ardet."

LETTERS FROM THE MOON.

Luna Villa, Misty County, in Nubibus.

Mr. Editor,

It will doubtless occasion you some little surprise to find amongst the communications of your numerous *sublunary* correspondents, one who dates from the regions of the Moon; but, I trust the reasons I shall offer, —the explanations into which I shall enter, will alleviate any alarm you might naturally feel at the idea of a Lunatic correspondence, and sufficiently account for an address from so distant a quarter.

The cause of "this present writing" then, is briefly this:—I have just returned from a visit to Mother Earth, (as we of the Moon familiarly term the respected Planet around which it is our pride and pleasure to revolve); and the things I have seen, the matters I have heard;—the wonderful things done, the still more wonderful things left undone on the face of that venerable orb, so astonished even my ethereal nature, that immediately on my return to Luna Villa I was seized by the *cacoethes scribendi*, and an irrepressible desire to transfer to your valuable Journal, the observations and results of my terrestrial peregrinations.

From peculiar circumstances it happens, that the particular objects to which your publication is more especially devoted, are precisely those which have constantly occupied my attention and solicitude. The mighty improvements which may be effected by the united talents of the Surveyor, Engineer, and Architect, have been, to me, always interesting; and, as to these subjects my observations have been chiefly directed, during my brief sojourn on Earth, the propriety of conveying my ideas to the *sublunar* public through the medium of *your* pages seems unquestionable. In this respect, perhaps, your opinion may not exactly coincide with mine, and you may consider my assumption rather too much of a *coup-de-lune*:—there is no accounting for Editorial prejudices; but, in my poor judgment, your refusal to insert my letters will, at the least, prove you a very fit subject for a writ *de Lunatico inquirendo*.

Mais, revenons à nos moutons.—The inherent volatility of character exhibited by the denizens of the Moon, will scarcely be conceived by the more sober inhabitants of the Earth. Fashion in all its phases,—change in all its varieties, is the constant delight of the people; and the whole planet is turned *topsy-turvy* at least once a fortnight. But in nothing is it more remarkable than in the perpetual propensity of the people to fly from place to place, with the greatest possible celerity, and often for the least possible reason.

This peculiarity has become so well understood by our schemers, that no invention, however ridiculous or impracticable, which professes to have for its object the annihilation of time and space, by furnishing the means of more rapid locomotion, but is greedily patronized by *our* Stock Exchange, and instantly forced into notice and celebrity. You will readily imagine then, that with us, the boasted speed of your railways is mere creeping; steam is *exploded;* balloons are falling, and going by water is *no go*. Our last new invention was a species of *projectile*, in some respects resembling your Congreve rockets, and intended to effect almost as rapid a transition from place to place. On its first appearance, the most sanguine expectations were entertained; a Joint-stock Company with a capital of fifty millions was immediately formed; the shares were freely taken at the trifling premium of a thousand per cent., and a grand trial ordered.

I had the happiness, sir, to be the chairman of the Patent Flash of Lightning Conveyance Company, and was selected by acclamation

to make trial in my own proper person of the merits of the invention. Deeply sensible of the honour thus rendered to me, I cheerfully yielded to the general wish, bowed profoundly and repeatedly to the assembled multitudes, and mounted the peculiarly-shaped Pegasus, which was to convey me *fifty miles* in *two minutes*. Scarcely had I taken my seat, when the operator turned the motive screw. Crack, whirr, buzz, fizz, and with a loud report I was hurled into the illimitable regions of space. How long I was whirling through the air I know not, all sensation had left me, and I only regained my consciousness on finding myself lying in the light of the moon, but on the bosom of the earth, in the Chalk Farm depôt of the London and Birmingham Railway.

Hinc illæ lachrymæ,—hence this epistle. The inventive genius who sent me to the earth not having provided for my return, I was obliged to wait until Colonel Maceroni had completed a machine to transport me again to the shades of Luna Villa. The result of my observations while on the earth shall appear hereafter, if you will find a place for the lucubrations of

MOONSHINE.

TO THE EDITOR.

SIR,

As numerous inquiries have been made relative to the expense of paving streets in the manner suggested by me, and noticed in your journal of December last, I beg permission to avail myself of your pages to state, that the Metropolitan Wood-Pavement Company have entered into engagements with me, to contract for any quantity of paving on my plan, with concrete foundations, at 13*s*. per square yard.

They will further undertake to keep the same in repair, including all expenses of sweeping, cleansing, &c. for any number of years, at 1*s*. per square yard, per annum.

I am, sir,

Your obedient servant,

EDWARD LOMAX.

2, Queen Square, St. James's Park,
Jan. 20, 1841.

SCIENTIFIC SOCIETY OF LONDON.

THE usual monthly conversazione of the Scientific Society took place on Thursday evening, Jan. 21st, when the chair was taken by Charlas Maxon, Esq. A paper was read by G. F. Fordham, Esq. on the scientific ideas of a Wave and of Polarity, in which the several characteristics of wave-motion were pointed out, and the general property of "polarity" explained and defined.

The scientific idea of a wave will be obtained, by considering that the particles concerned in its production pass through a cycle of changes in position, always returning at short intervals of time to the point from which they started, while the wave itself, which is formed by the union of one series of changes, advances always in the same unvarying direction. This description of a wave is applicable to all varieties, and whether propagated along the surface, or through the interior of the agitated medium. The idea of polarity has been derived from observing various instances of physical phenomena, where *a contrast of properties* is found in constant connection with *a contrast of positions*. The magnet and polarized light exhibit examples of this. The value of these two general ideas had been much insisted on by Professor Whewell, of Cambridge, and they would be found, if accurately examined, to open a view of some of the most elegant and interesting branches of physical science. Some specimens of manufacture in slate, from the Pimlico Slate Works, were exhibited at this meeting, which excited much attention, and showed the great variety of purposes to which this article may be applied. The meeting then broke up, apparently much gratified by the proceedings of the evening.

[*Note by the Conductor*.—We are extremely sorry that, ever since this excellent and industrious society commenced its labours for the annual session, we have been so afflicted by severe indisposition, as to be unable to attend its interesting meetings, or, indeed, to pay any attention to it. We hope that, until we ourselves are able to enjoy the pleasure of attending the meetings, the secretary, or some other gentleman intimately acquainted with, and deeply interested in, the institution and its objects, will oblige us with a short summary of what is going on, to which we shall pay that attention which is so justly merited. Perhaps the council of the society will oblige us by sending a fresh card of admission to the printers, Messrs. Baker and Darby, 90½, Holborn Hill, as we mislaid the former one. Meantime, the society will be pleased to accept of our best regards.]

INSTITUTION OF CIVIL ENGINEERS.

NOTES OF THE SESSION.

Tuesday, Jan. 12th, 1841.

THE first meeting of this society took place on Tuesday, the 12th inst.—and was attended by a tolerable sprinkling of members. The chair was filled by Mr. Field, one of the vice-presidents, who, albeit a worthy man and a clever, made us lack *the* chairman. Certes, we are not advocates of a perpetual presidency;—we would not have the seat of Telford occupied by any one, however well qualified, for a continuance—(for *his* claims to the presidential chair, be it remembered, were of a peculiar nature, as the founder of the society), we would not have this to be a stepping-stone to any man's greatness; but it cannot be doubted that Mr. Walker is a most active, persevering, and zealous president, punctual and constant in his attendance, liberal in his gifts, courteous in the chair, and, though somewhat wanting in dignity perhaps, still the best, decidedly the best, we have seen preside over the meetings of the society, since the days of Telford. *Mais revenons* to our muttons—that is, the Institution of Civil Engineers.

The proceedings of the evening were peculiarly dry, stiff, and uninteresting—rich in sameness—redolent of monotony—no flashing sparks of heaven-born science cast a momentary brilliancy over our darkened atmosphere, but all was stale, flat, and unprofitable. Groaning in spirit, and in our bodily presence yawning most fearfully, we were sighing for the welcome summons of the cates and coffee of the library, when Mr. Sopwith, of geological notoriety, aroused us from our sombre meditations.

At the last meeting of the British Association, it appears that a committee was appointed to take steps for preserving accurate representations of the appearances presented by the strata when exposed to view in the deep cuttings of railway works. On this committee were several of our eminent geologists, and amongst other measures to forward their purposes, it was suggested that an application should be made to the Institution of Civil Engineers for its co-operation. As the organ of the committee, Mr. Sopwith introduced the subject to the meeting, and after pointing out the importance of geological knowledge to engineers, proceeded to explain the wish of the association to secure accurate delineations

of the sections of strata on all our principal railways, to obtain for a museum already formed specimens of geological interest, and to ensure, more especially from the junior branches of the profession, their assistance in obtaining such drawings and other information as they may be enabled to contribute.

He exhibited a scale decimally divided, on which the sections of strata may be laid down thus—the lower part being on a scale of one-tenth of an inch to the foot, the upper in similar proportion for enlargements of particular parts. The observations of Mr. Sopwith were listened to with much attention, and had farther this good effect, that the long sought for establishment of lectures was again brought forward, and agitated with much force by Mr. Farey, Mr. Horne, and others.

In the course of the evening, the following paper was drawn up by these gentleman, and circulated amongst those present. Its contents will give an idea of the boon sought for, and pertinaciously refused by the council:—

PROPOSALS FOR ESTABLISHING LECTURES TO BE DELIVERED AT THE HOUSE OF THE "INSTITUTION OF CIVIL ENGINEERS."

The object and tendency of the lectures to be the dissemination of correct knowledge of all such scientific principles as are of direct application to the practical operations of Engineering, with full explanation of the manner of that application.

Individuals desirous of having a lecture, or a course of lectures, on any particular subject, and which lectures they will engage to attend, and whereof they will defray the expenses, must subscribe their names in a list, headed with an explanatory statement of the nature and tendency of the intended lectures. And when not less than thirty persons have so subscribed, they (the subscribers) are to choose out of their number a committee of not more than six, for the purpose of making all requisite arrangements relative to the intended lectures, and a majority of at least three-fourths of the subscribers having, with the advice and assistance of their committee, decided upon the names of one or more competent persons, from whom it would be desirable to have the intended lectures, the committee are then to request the council of the Institution to grant the subscribers then on the list (with such others as may afterwards be added), the use of the rooms of the Institution, on certain appointed days, and within certain hours of those days, for the purposes of such proposed lectures. And such grant being obtained, the committee are then to proceed to negociate with the persons from whom the lectures are desired; to arrange all preliminaries with them; to fix the amount of expense to be borne by each subscribed on the list, and to make all such regulations as may be found requisite.

Tuesday, Jan. 19.

This being the annual general meeting, the new council was ballotted for, the report of the council for the past year read, approved of, and ordered to be printed; and the customary votes of thanks passed to the officers.

Our opinions are well known to be opposed to the chair of the institution being held too long by the same individual; however high his qualifications for the office, we hold that a change tends to give new life and vigour to the conversations and discussions of the meetings; and by exciting a little more of rivalry, or perhaps we should say, emulation amongst the members, prevents their falling too much into the peculiar way of thinking of the *presiding genius* of the society. But it must be confessed that Mr. Walker is popular amongst the juniors, and the enthusiasm with which the thanks of the meeting were voted to him, should go far to prove that all parties are well satisfied to remain as they are. If this be so, we are content, and shall not attempt to impugn the judgment of the wise.

The only subject of interest during the evening was that of the lectures already alluded to, on which Mr. Horne addressed the president, and was followed by Mr. Farey. These gentlemen earnestly impressed upon the meeting the advantages of lectures on subjects directly connected with the profession, and wished that immediate arrangements should be made for a lecture on geology by Mr. Sopwith, who had kindly offered his services.

The president replied by assuring the meeting that the council had had the subject under consideration for some time past; but that they felt a difficulty in opening the rooms of the Institution for a purpose of this kind. The council had been in communication with several gentlemen on the matter, and had decided that it was not advisable to commence the plan of lectures, strictly so called. It was considered better to have a short paper on the selected subject read, and than the writer be called on to give such explanations and illustrations as might be necessary;—thus, it was thought, obtaining all the advantages of the lecture, without the inconveniences.

We know not whether this decision was satisfactory, but it was submitted to with a decent grace, and we believe Mr. Sopwith will give us his lecture in *council-shape* next meeting.

Tuesday, Jan. 26.

There was no meeting this day.

A GLANCE AT LIVERPOOL.

LIVERPOOL is rather a portentous name; for if we except London, there is not one applicable to any town in the three kingdoms, which calls up so many spirit-stiring associations. When we speak of the associations which the name of a place calls up, we do not speak in the language of historians or antiquaries. The associations upon which they set their affections, are of no use or value whatever to the Surveyor, the Engineer, or the Architect. They are a sort of monument-mongers, and what delights them is, the memory and the memorials of that which has gone for ever from the scene of activity and usefulness. In our estimate of the matter, we care not one straw how many or how few sieges and battles may have taken place in any one locality, or what great men may there have laid down their lives on the cold altar of honour—most falsely so called. It would be just as wise to hope that the tomb-stones in a country churchyard should school the farmers into the method of obtaining better and more abundant crops from the neighbouring fields, as that those boasts of ancient days should advance the arts one tittle, or better the condition of any individual now living or hereafter to live.

The associations to which we allude are of quite another kind. They have something vital in them,—something which only requires the application of human ingenuity, skill, and activity, to make it increase the comforts of the people, and by this means add to the wealth and strength of the whole state.

Now, when we take the map of the three kingdoms, and look at the situation of Liverpool, the first thing that strikes us is the fact, that in point of ready communication with every part of Britain, and with most foreign countries, there is no place equal to it. We may even go considerably farther in this, for if we look at the map of the world, we find it a difficult matter to alight on a second Liverpool. But, turning to its own position, it is in a great measure central to England, Ireland, and Scotland; at least, it is vastly more so than any other town. The whole of the estuary of the Mersey, up to Runcorne, is the pool from which the town takes its name; and though there are some hazards at the entrance, Liverpool may be said to be a most accessible as well as a most spacious port. Both banks of the estuary can be made available for docks; and therefore there is no limit to the extent of the harbour, but the necessity of it for the purposes of trade. In this respect, it has greatly the advantage of London. The Thames is long; and twines through the marshes like a serpent; some of the reaches are naturally dangerous; and, perhaps, there are in the Thames, twice as many shipwrecks in the course of the year, as there are upon double the length of the most dangerous coast of any of the three islands. The Mersey is exempted from this home destruction, arising from crowding and other causes; and this is in itself a very great superiority. While we say this in favour of the Mersey, it is far from our wish to disparage the Thames. It is a splendid river; and if those who have the conservation of it would pay half as much attention to the river itself and the means of its improvement, as they do to their own infarction, when, in their gay barges upon the water, they flirt with the waves, like so many Doges of Venice of the ancient time, holding soft dalliance with the Adriatic Sea, until they were at last fain to render up their cates to it as a most appropriate votive offering,—if they would take the Surveyor and the Engineer along with them, both men well qualified for their duty, the navigation of the Thames might soon be put in a very different state from what it is in at present. Of this, however, merely a word by-the-bye at present, for it will recur again and again in future. Into the estuary of the Mersey, there are no large rivers flowing by long courses over loose and sludgy grounds; neither are there any confluent or conflicting tides to cast back the matters so brought down into banks in the offing. This is not the case in the Thames; for the rivers which fall into it bring down vast quantities of silt; and this receives, perhaps, a still greater addition from the decomposition of the land, which is going on at a very rapid rate. The Channel-tide will not allow a particle of these matters to get round the North Foreland to the south, though it is probable that a part of the more solid may, during the indraught of the ebb of that tide, find its way to the Goodwin. The north tide, again, prevents any portion from being carried very far to the north, though there is understood to be a regular deposit upon the sands to seaward of Yarmouth Roads. By far the greater part, however, is deposited in the immediate offing of the Thames itself; and the channels between the different portions of this are intricate, and require skilful piloting in many states of the weather. These banks, too, appear to be all accumulating; and they may accumulate till no ship-channel is left, and the Thames ceases to be a navigable river. It is true that it is a very remote contingency, one of which no soothsayer can even guess the time; but it is within the limits of possibility, without any reference to an upheaving of this part of the bed of the water, or of any geological disturbance whatsoever. In the case of Liverpool, it does not appear that there is any such accumulation. A bay-tide sets from the Irish Sea up the Mersey; and seems to clear by its ebb what it may bring up at its flood. The coast of Lancashire to the north, and that of North Wales to the south, direct the bay-tide into the Mersey, as into the narrow part of a funnel; and as the principal tide from which this bay-tide is derived is both distant and feeble, it does not at all affect the motion of the water to and from the Mersey. This is one of the most favourable kinds of tide that can well be imagined for a great port. The play of the waters right in and out, has no tendency whatever to form any bar, or new and increasing obstruction to the navigation. Whatever dangers there may be in the entrance to the harbour of Liverpool, they are known and permanent ones; and, therefore, it only requires the proper engineering, and the requisite outlay of money, to remove them, or make them less hazardous. So much for the position of Liverpool as a mere port.

We may now look at it in its connection, by land of course, with England; and then at the facilities of intercourse which it has with the two sister-kingdoms. If we take the left bank of the Mersey, there is first the great valley of the Dee, of Cheshire, and a considerable portion of Shropshire, to which Liverpool is the real port. Chester, indeed, is between them; but a single glance at this ancient and venerable city suffices to convince any one, that it can never be a very formidable rival to any other place in the way of trade. The points of attraction do not belong to the present time, nor do they savour a jot of activity or usefulness. The crumbling cathedral, the majestic castle, the walls, still perfect from very remote antiquity; the carriage ways of the street, excavated out of the rock, and the piazzas, or rather rat-holes, which are formed on each side of the principal streets, are all that are to be seen in Chester; and most of them are very old, and all of them very useless in the present state of the country.

Now, when such are the only kind of wares whereof a city has to boast, one may safely conclude that there is really nothing modern in the place, at all calculated to interest any body. We have heard that, as appropriate adjuncts to these venerable erections, there are within Chester a vast number of Welsh and other spinsters, who have reached the utmost limits of the years of discretion; but this subject does not properly come within our province. Eastward of the Dee, we have the great valley of Cheshire and Shropshire, connected with Liverpool to a considerable extent southward of the summit level; and we shall afterwards see that this opens up many benefits to the trade of the port. Eastward, the mountains narrow the natural expanse which opens on the Mersey; but this is in a great measure obviated by artificial lines of communication, both by water and upon land. In consequence of this, the whole of West York, by far the most valuable part of that county, is connected with Liverpool; and the connection extends by Goole, Hull, and some other ports, to the free navigation of the eastern sea. Northward, the whole of Lancashire, with much of Westmoreland and Cumberland, are open to Liverpool, partly by canals, and partly by railways; and it is understood that before long this kind of intercourse will be extended as far as Scotland.

A great part of what we have mentioned appears to be physically connected with Liverpool by the slope of the country; but the lines have extended, or are in the progress of extension, to almost every part of the kingdom:—to London, to Bristol, to the manufacturing part of Somerset, to Southampton, through Kent; and, in due time, they will be ramified over all the more valuable part of the midland counties. By a land communication, Liverpool may

be said, therefore, to be connected with all England, and to be reachable from any part of it, in very brief time.

Nor are its facilities for communication by sea at all inferior. For Ireland, it is *the* port, notwithstanding the increased intercourse which there now is between the south of that country, and the Bristol Channel and the south-west of England. The navigation of the Channel is just as easy, though not quite so close at hand, for Liverpool ships, as for London ones; and though the voyage round the north of Scotland to the Baltic is longer, and at some seasons more dangerous, than the direct voyage across the North Sea,—yet it is practicable; and between London and the Baltic is not the most profitable voyage that could be named. From the Humber to Aberdeen is the natural locality of the Baltic trade; and as the manufacture of hemp and flax is the established one in that part of the country, it is much better left undisturbed. For all the more distant navigations, Liverpool is much better situated than London, or indeed than any other great port in the empire. In beating south through the Irish Channel, there is always sea-room, if it is rightly managed; and vessels for the south of Europe, the Mediterranean, Africa, America, Asia, Australia, or the smaller oceanic islands, can, in those winds which hold the London ships bound, keep as much to windward as to enable them to clear the chops of the Channel, so that they have neither danger nor delay to apprehend from that quarter. It would be easy to go into the details: but our present object is only to take a glance, as a sort of memento to ourselves that Liverpool and its surrounding district are eminently worthy of our attention, as places where more has been done, and more can still be done, to promote all the more useful arts, and those of Surveying, Engineering, and Architecture, than any other locality that we could readily name. But though we are merely taking a glance, with hardly any allusion to a single name, or a single detail, there is another view of what may be called the home ground, which it may be desirable to take.

It would be of comparatively little avail, that a port had the most free and ample land communication with a district of country, however large, if that country were barren, or deficient in such things as are valuable to the commercial list. Now it so happens, that the value of the districts to which Liverpool has this access, is far greater than even their extent. Beginning as we did in the former case, we have, first, the lead and iron mines of North Wales. The iron may not be so especially wanted, because abundance of it can be made near Liverpool; but the lead of the Halkin mountain, Minera, and some other places, exists in vast quantity, and is generally very easily worked. The stratum in which it is found, is the mountain limestone, which overlays the clay-slate; and this limestone is often so cavernous as to render all drainage of the mine quite unnecessary. Proceeding eastward, we next come to the salt mines of Cheshire, and some part of the adjoining counties, the produce of which, both used at home and sent abroad, is very great.

Passing these, we come to ready communications with the whole circle of the grand manufacturing districts of central England, which are certainly not parallelled on the surface of the globe. First we have the iron works of Wolverhampton, and so on to Birmingham, the variety of mechanical devices displayed at which are quite unrivalled; and the remarkably low price is still more wonderful than the beauty of the execution. Then come the Potteries of Stafford; and beyond them, though at some distance, though still easily accessible, the whole of the chain-stitch and stocking manufactures. Inclining more to the north, we come upon the grand manufacturing district of West York. First, Sheffield with its cutlery, and Leeds with its spinning and weaving establishments. Still continuing toward the north, and crossing the summit level back to Lancashire, we are among manufactories; and Manchester with its numerous villages, may be regarded as the home factory of Liverpool. Not that it is an appendage of Liverpool, for neither of the two is an appendage of the other; and without the workshops of Manchester, the warehouses of Liverpool could not be kept going—and the reverse. Indeed, it is the beauty of the commercial system, and a beauty inseparable from it, that all the parts mutually and reciprocally support each other, without the slightest intention or contrivance on the part of those by whom it is carried on. And it is by this means that, when merchants and manufacturers enrich themselves, they also enrich the community to which they belong, without any one being able to tell why.

From the slight notice which we have taken of the different manufactories and markets for the disposal of British produce which open so conveniently upon Liverpool, it will be seen that, without any necessity of keeping an expensive stock on hand, a Liverpool merchant can execute an order of any amount or any variety in less time, and with greater ease, than any other merchant in England. This will always give a decided advantage to the town; and when, along with this, the other facilities are taken into consideration, they raise the character of the place still higher.

But, in addition to this proximity to abundant and diversified markets, in which goods can be obtained to suit the taste and the pocket of any foreign customer, there is a manufacturing value, so to speak, in the very land of this part of England. Lancashire is certainly not well adapted for a corn country, in consequence of the humidity of its climate, though it answers well with some species of vegetables; but coal is abundantly worked in many places; and there seems no reason to doubt that the beds of this mineral extend, under the red sandstone, over the whole county, and many of the neighbouring districts. Iron is also obtained in great abundance; and though the smelting of iron ore is perhaps not the most profitable occupation to which the industry of the people can be turned, yet it is well to have an abundant supply in case of emergency; and perhaps there is more iron worked up into steam engines and other large substitutes for animal power, than in any other county of England. It is indeed in an especial degree the land of Machinists; and the power of Lancashire machinery, employed in the mill, on the land, and in the water, is perfectly astonishing; nor are we sure that the duty which it does could be performed by any other means. Besides the labour of machinists, who supply the operative power, as we may so call it, there is necessarily a great demand for engineering, especially in so far as that facilitates communication. Therefore, Lancashire is an Engineer's country, as well as a Machinist's country; and if Manchester takes the lead in the last of these, Liverpool takes the lead in the first.

In such a district, where every man is treading on the heels of another in the march of improvement, it behoves the Engineer to be continually at work; because it is his business to prepare the way for those of more detail; and to keep them in that way after it is prepared. Such are a few points in the outline of Liverpool, as they present themselves to the mind without any particular study of the subject; and from them one may gather that it offers a very rich field to those who will cultivate it aright. We cannot say that it is at present an uncultivated field; because there must have been

much intellectual culture before those results which are apparent to every body could have been arrived at; but it is comparatively an unknown field, even to the writers of the metropolis, who might find in it the most ample and the most delightful materials. We are organizing a plan by means of which we hope to obtain a considerable deal of light on the subject from those who are personally connected with it; and if we should succeed according to our wish and our expectations, we trust we shall be enabled greatly to add to the interest and value of our Journal.

THE RIVER-FLOODS.

Though the quantity of rain which fell during the thaw of January was not great, and would, under ordinary circumstances, have passed off without much appearance, or any damage, yet, unabsorbed as any part of it was by the frozen earth, and freely as it glided over the smooth icy surface, it acquired the violence and force of a powerful flood, in all places where it met with interruption. The flood of the Brent is one of the most disastrous, as well as one of the nearest to the metropolis. It was increased by the casualty of the bursting of a reservoir belonging to the Regent's Canal company, which reservoir must have been wretchedly engineered, otherwise it would not have given way under the circumstances; for though there necessarily was much water collected in the valley of the Brent, and on its way to the Thames as fast as it could glide over the surface, there ought to have been nothing of the kind about the reservoir. In order that a reservoir may collect the summer floods with safety, some engineering is necessary; but far more is required if it is to collect the winter floods; for in such a case, its strength should be calculated above the maximum that it will have to bear.

The reservoir is, however, only a contingency; and the grand fault is in the valley of the Brent itself, especially in the part near to its outfall in the Thames. At the outfall of a smaller river into a larger one, there is very generally a gorge through a bank of alluvial matter, which has been gradually accumulated by the action of the two streams, and the currents of wind along their courses. This gorge has very often a flexure, or twist; and, if the velocity of flood water above this is slow, as is usually the case in the flat parts of England, its progress is arrested until it makes considerable head, so as to gain the entrance of the gorge with increased velocity. Of course, as the stream narrows in this gorge, it deepens, and acquires additional velocity and power, until that which in the flat valley above was a merely harmless expanse of water, creeping slowly along, becomes a torrent-flood, which hardly anything will resist. To add to the certainty of mischief, there is often a bridge thrown across, just at the very place where the flood wants the most escape, and, upon parsimonious grounds, this bridge is generally deficient in water way, while the angle at which it crosses the stream is often the very worst that could be given it.

Bridges, even those upon a large scale, and of course, expensive in the erection, are often built in these absurd places. If the river, and its feeders, have their sources in deep mountain glens, where there are no regulating lakes, then the bridge itself is made to pay for the ignorance of the engineer. It comes down red and roaring, charged with gravel and masses of rock; and with these it batters the bridge, till not one stone is left upon another.

In more level places, an inundation of the fields is the usual consequence, but these are often much injured by the deposit of gravel and other coarse substances; and if the flood is a violent one, the stream sometimes brings down matters, which choke up the arches of the bridge, and thus convert it into a sort of dam. If the bridge is strong enough to hold out, the flood above generally tries to find its escape by ploughing up unsightly water-courses in the field; and if it gives way, the flood below is often very destructive.

We have seen so much of this devastation, both in mountainous and in comparatively level countries, that, ever since we began our labours in the "Surveyor, Engineer, and Architect," we have let slip no opportunity of throwing out hints upon Fluviatile Engineering: and the fact, that these appear to have attracted less attention than matters of trivial import, shows that this subject is neither attended to nor understood.

TO THE EDITOR.

Sir,

The inhabitants of Norfolk at length perceive the disadvantage of their isolated position, and are now forming two companies; one for a railroad to Cambridge, the other to supply accommodation for bathing visitors in Yarmouth, by a range of very tasty buildings. Fully convinced of the utility of these objects, there are a few observations which I wish to offer, with the view of preventing the failure of these schemes, as too many useful projects in Norfolk lately have done (the Norwich and Lowestoft ship-canal for instance). Now, in the first place, I think they ought to avail themselves of the advantage which nature has given them, before they attempt one for which they have no *peculiar* advantages. The following large towns in that county have tolerably deep rivers flowing through them, the navigation of which is only prevented by water-mills: Fakenham, 20 miles from water-carriage; Wymondham, 8; Loddon, 5.

Besides these, at Lopham, the Lesser Ouse and Waveney take their rise; the latter flows eastward, becomes navigable at Bungay-bridge, and discharges at Yarmouth. The former empties itself into the Greater Ouse, and is navigable at Thetford. Ought not a canal to be made joining these two, and continued where they are not deep enough, for barges and locks to pass the mills?—thus opening a communication between the ports of Yarmouth and Lowestoft, and the towns of Eye, Dies, Harleston, and Bolesdale, and all the towns in the fen districts.

A company who had subscribed 20,000*l.* was once formed for this purpose, but was dissolved on account of the opposition of a powerful landowner, calling himself a "*liberal;*" he is now a candidate for the representation of East Suffolk, and should show himself *really* desirous of improving his native county, before he is allowed to represent its interests.

It is hopeless to calculate upon the traffic from Lynn, and the north-western parts of Norfolk, along the East Anglian line of railway, at Thetford. The latter place being 30 miles from the former, and 36 from Cambridge, the transit from Lynn to London may be effected sooner by coach to Cambridge, than by making a detour through Thetford. The navigation from Lynn to Thetford is fully as tedious as that to Cambridge; and, therefore, the latter place would become the entrepôt for the carriage of heavy goods.

If, however, the Wensum were made navigable from Fakenham, which is 10 miles land-carriage from Wells (the nearest sea-port), and but 20 water by the Wensum to Norwich, the heavy goods

would come by it from the west of Norfolk to Norwich, and thence by railway to London.

Another objection to the line of railway chosen by Mr. Rastrick is, that it passes a mile distant from the town of Acle, where I contend it ought to meet the river Bure. If it came there when the first 10 miles from Norwich to Acle are opened, steam-packets might ply from thence to Yarmouth; and thus save the expense of keeping post-horses at the station, while, doubtlessly, the company might purchase the new road from Acle to Yarmouth, and thus have, ready formed, a solid foundation for their line through the soft peaty delta, formed by the junction of the Waveney, Bure, and Yare.

Apologizing for trespassing on your columns,

Believe me to remain,

Yours sincerely,

Newmarket, January 25. H. J. S.

PROPOSAL FOR ESTABLISHING A BRITISH ASSOCIATION FOR THE ADVANCEMENT OF THE FINE ARTS.

Sir,—A knowledge and consequent due appreciation of the fine arts,—the arts which purify and ennoble,—are now observable amongst much larger masses of persons in the metropolitan cities of the United Kingdom, than was the case twenty years ago; and must inevitably go on to augment in a greatly multiplied ratio, as every step gained becomes the means of further advances. In the provinces, too, where there are fewer "appliances and means to boot," the attention of the people to the importance of the fine arts as civilizing agents, and as tending to promote the general good, and therefore the general happiness, has visibly increased, and has manifested itself in more than one good result. Still there is a wide field here open for exertion: and so undeniably important is the object to be attained, so vast is the good that would result from spreading a taste for the fine arts throughout the country, and inculcating a love of the beautiful, that no efforts could be too great, no scheme of operations could be too extensive, which should propose to effect it.

Experience shows the advantages which have resulted from the establishment of the "British Association for the Promotion of Science," not chiefly to science *per se*, although these have been great and manifold, but to the people generally: attention has been awakened in the minds of thousands, to subjects before unthought of; a spirit of inquiry has been induced: and whole towns inoculated with an admiration of knowledge, and a determination to pursue it, to the exclusion of demoralizing sources of excitement, until then indulged in. Why, then, might there not be formed an association for the encouragement of ART, which, like this, should meet annually at a different town in England, Ireland, or Scotland, and at which meeting, painting, poetry, sculpture, architecture, &c., &c., in all their varieties, and with all their ramifications, should form the subjects for the consideration of the different sections. A large and important exhibition of works of art might be collected, and an Art-Union arranged so as to secure the sale of a certain number of them, and thus to ensure the assistance of the most eminent artists, by rendering the society directly, as well as indirectly, advantageous to them. A small subscription (say of one pound) would constitute a member of the association for the year, the aggregate of which, after deducting the expenses necessarily incurred, would probably enable the committee (which should be partly local, partly general) to offer prizes for competition in the higher branches of the various arts, and vote sums for the encouragement of any desirable object, in connexion therewith; such, for example, as for the prosecution of experiments in the preparation of colours, the manufacture of stained-glass, or for the purchase of particular pictures, worthy of national regard.

During the meeting the various local collections would be thrown open to inspection; conversazioni would be held; and other means adopted to bring men into contact with each other, on one common ground. One of the first points to be achieved by the united sections would be, to obtain an able and correct report of the progress of Art in England, Ireland, and Scotland, for the last fifty years—a task to be fulfilled satisfactorily only by the joint co-operation of men in all parts of the country. This report would afterwards be continued from year to year, under its various heads, and could not fail to prove a work of the highest interest and value. It is not here attempted, however, to point out what *could* be done by a society organized on the footing suggested: its power of effecting much good must be apparent to all, and needs hardly to be insisted on. The writer is contented simply, but with great earnestness, and but one object,—namely, strong desire to serve the cause of Art (the cause of morality and public good), to state the proposition, in the hope that others of more ability, influence, and leisure, may view it as it has appeared to him; and be induced to carry it into execution, efficiently and forthwith.

GEORGE GODWIN, Jun.

Pelham Crescent, Brompton, Jan. 1841.

SCIENTIFIC COMMISSION.

FALL OF MOUNT ARARAT.

AT a late sitting of the Academy of the Sciences at St. Petersburgh, Professor Parrot delivered the following address:—"The late fall of a considerable part of Mount Ararat is an event of such importance in the natural history of the earth, that I think it right to invite the special attention of the academy to it; and the more so, as the different accounts that have reached us respecting this dreadful phenomenon are very confused, and are at variance with each other. In ancient times, perhaps anterior to all history, a similar fall must have taken place. This is proved by an immense cavern, on the north-north-east side of the mountain, which is called by the inhabitants the "Dark Cavern;" it begins above, in the regions of eternal snow, and extents downwards to the depth of 800 toises; the circumference must exceed 600 toises. The whole of the interior of this cavern presents almost perpendicular, uneven, and rent surfaces of lava, which give evidence of the operation of a prodigious power. The recent phenomenon seems to have been of a similar nature, but on a larger scale. An accurate examination will certainly procure us important information respecting the nature of volcanoes. The late catastrophe may, perhaps, allow the observer to examine this ancient volcano in its inmost recesses, or at least as far as the channel through which the masses of lava rose and were discharged; the lava must certainly still fill it up to its issue. Its direction upwards will be plainly marked by several indications, especially by little bladders which form furrows in the surface of the lava, and increase in their extent as they are nearer to the summit. On these considerations, I propose to ask the consent of the government to the appointment of a scientific commission for the purpose of making an accurate examination of Ararat and the adjacent country. It will be very interesting and important to visit all the places covered with the fragments, and to observe the great detached masses, which will undoubtedly increase our knowledge of volcanic eruptions, their structure, and composition. Perhaps the expedition may find large masses of sulphur, perhaps even openings in the sides, or at the bottom of the cavern, through which the volatilised sulphur escapes, and form such kinds as in the Solfaterra, which would be highly important to Russia. The expedition must obtain as extensive information as possible respecting the various directions taken by the eruption; thus it will be able to discover the focus of these great convulsions, and, at the same time, that of the volcano. It will have to make an excursion into the lofty yet unexplorable mountain chain which bounds the rich and beautiful valley of the Araxes, to obtain a knowledge of its nature, which, perhaps, is also volcanic. If the academy approves of my proposal, I will undertake to put together all the information I possess respecting volcanoes, for the purpose of drawing up the necessary instructions, and lay it before the academy." In conclusion, the learned professor regretted that he could not propose his son (professor of Natural Philosophy in the University of Dorpat) to conduct this expedition, as he was then labouring under a serious and dangerous illness. The latter, it is well known, made an accurate survey of Ararat a short time before the late catastrophe, and is perfectly acquainted with the locality.—*Mech. Magazine.*

EXTRACT FROM THE EVIDENCE

TAKEN BEFORE THE SELECT COMMITTEE OF THE HOUSE OF COMMONS ON THE TIMBER DUTIES, PUBLISHED DECEMBER, 1835.

Extract from the Evidence of Mr. Warburton, M.P.

QUESTION 5159.—End of ANSWER.—With regard to dry-rot, very few cargoes of timber in the log come from America, in which, in one part or other of each log, you will not find a beginning of the vegetation of the dry-rot. Sometimes it will show itself by a few reddish discoloured spots on the surface of the log, which, if you scratch with the nail, you will find that to the extent of the spot the texture of the timber, to some little depth, is destroyed; it will be reduced to powder on your scratching it; you will generally see, also, on those spots a white fibre growing. If the

timber has been shipped in a dry condition, and the voyage has been a short one, there may be some logs without a spot; still I should think there was scarcely a cargo that came from America in which you will not find many logs of timber thus affected. But if the cargo has been shipped in a wet condition, and the voyage has been a long one, then a white fibre will be seen growing over every part of the surface of every log; and in cargoes that have been so shipped, I have seen all the logs of yellow pine, of red pine, and of oak, more or less affected on the surface.

Q. 5860.—Have you been in the habit of seeing cargoes of timber and deals in the ship's hold?—A. I have very frequently seen such cargoes in the hold.

Q. 5861.—Did you ever notice that the same white fibrous appearance which you have described as so frequently visible on the American timber and deals also extends itself over every part of the ship?—A. It may; I never noticed it; I think it very likely that it would. It is easily prevented from injuring the substance of the ship's timbers.

Q. 5162.—Do you know whether that ends in the decay of these parts?—A. If the ship is built of good, sound, well-seasoned heart of oak, I question whether it would affect it. But, in order to prevent its doing so, the precaution is usually taken, I believe, to scrape the surface, as soon as the hold is clear of a cargo of lumber. Were the cargo not cleared out, and the hold not ventilated, a ship that was permanently exposed to this fungus would, no doubt, be affected. I had the interior of my ship washed with a solution of sulphate of copper or blue vitriol, to prevent its taking the dry-rot. This metallic salt, or a solution of corrosive sublimate (which is the principle of Mr. Kyan's patent), and, indeed, a solution of several other metallic salts, will completely prevent the rot from extending from the cargo to the ship.

Q. 5166.—Are you of opinion that if the whole of a cargo of American timber and deals were put into a solution of Kyan's patent, there would be any difference as to the quality?—A. A solution of corrosive sublimate may prevent the dry-rot from vegetating, or any premature decomposition or decay of the wood, but it can never change the quality of the wood, nor alter its texture, so as to make that mellow which was rigid and disposed to warp, nor that dense and compact which was light and spongy. * * * You certainly incur a risk by using timber of that kind (American red pine), unless a closer examination be made of the surface of each log to be used than most architects or builders are likely to make, or unless you have recourse to preventive means, such as Mr. Kyan's patent, or some other such mineral poison may afford.

ON GAS LIGHTING.

ECONOMICAL MODE OF SETTING AND WORKING RETORTS, SHEET-IRON PIPING, &c.

Sir,—Amid the multiplicity of inventions and improvements of modern science, we ought not by any means to neglect one which is of such high importance as gas lighting. Not only is it important to capitalists, but also to a great portion of society, and one which only a few years ago excited the greatest wonder and admiration.

Although we may perhaps have arrived at something like perfection in point of theory, still there is much to be done in the practical carrying out of theoretical principles in a more simple manner, and what is of most importance, with a smaller outlay of capital at the onset, and a subsequent reduction of expenses of working them, so as to realise a greater return for the capital embarked.

It is by these means alone that a more extended system of gas lighting can be achieved, whereby our smallest towns can profitably avail themselves of so great a comfort, and I may say, in some instances, a luxury.

Many patents have been obtained for different kinds and constructions of retorts for generating the gas. Brick ovens have been patented and used with various success; still, in many large establishments, the circular retort prevails, as first invented at the commencement of this extensive manufacture.

Whatever advantages may be derived from the use of large brick retorts, or ovens, as they are sometimes called, or by setting a number of iron retorts in one furnace, in large works, to reduce the proportionate amount of fuel consumed in heating them, there is no chance of our smaller towns and villages availing themselves of this plan, as these means are too extensive to be adopted under such circumstances.

In such localities (as indeed in all others), therefore, we must endeavour to obtain a plentiful supply of gas from as small a retort area as possible, as this is a serious item in the expenditure of a gas manufactory; and also to heat the same without any loss or consumption of fuel in the furnace wherein the retort is fixed.

Now to effect these purposes, my attention for the present being directed to the small town of Wem, I have at this time one circular retort, 15 inches diameter, and 7 feet long, set in a circular oven 7 feet in diameter; the bottom is laid with fire bricks, and the top, which is of a dome shape, rises about 4 feet 6 inches. This oven is charged with about 10 cwt. of rough slack, from the neighbourhood of Rhuabon, in Denbighshire; the door-way is then bricked up, and in 26 hours it produces about 6½ cwt. of good strong coke, which I sell for malting and other purposes. By the heat given out during the coking process, the retort is kept constantly at a bright red heat, almost approaching to whiteness, whereby I am enabled to make as great a quantity of gas from one as I formerly could from two, and sometimes three retorts.

There are 36 streets, and about 150 private lights; but as I only employ one, and that not an able man, the retort is idle a portion of its time; but if worked regularly and unremittingly, I have no doubt it would supply 250 lights.

Here, then, where there is a good market for the coke, there is not only a profit on the process of converting slack into coke, both in the oven and in the retort, but one actually does the work of two or three, whilst the man has the firing to attend to only once a day, thus diminishing his labour by one half; the use of fire doors, frames, and bars, is also dispensed with. The expense of putting up an oven of this description is not more than half that of the usual mode, being extremely simple in its construction and action, and where smoke is not much nuisance, a chimney is unnecessary, as no draught is required to this kind of oven.

Two retorts may be fixed in the same oven as easily as one, and worked in precisely the same manner. I should have stated, that the oven above described has been in work since Midsummer last, and has realized my most sanguine expectations; the present retort was put in about the middle of September, and I expect it will last another fortnight.

If piping, made of suitable sheet iron, turned and brazed precisely as I have seen iron tubing on the continent, were made use of in the ascension pipes, hydraulic mains, condensers, &c., it would not only be cheaper and more sightly than the masses of cast iron now made use of, but by bringing the crude vapours in closer contact with the atmosphere would very much assist in the important process of perfect condensation.

Trusting the above will be of service to some of your numerous readers, I submit it to you for insertion in your highly valuable, and widely circulating journal.

And am, Sir,
Your most obedient servant,
Wem, Salop, Jan. 18th, 1841. John Thomas.

INSTITUTION OF CIVIL ENGINEERS.

TELFORD PREMIUMS, 1840.

The Council of the Institution of Civil Engineers have awarded the following Telford premiums:—

A Telford Medal in gold to Josiah Parkes, M. Inst. C. E., for his two papers "On Steam Boilers," and "On Steam Engines, principally with reference to their Consumption of Steam and Fuel," published in the first and second parts of vol. iii. of the Transactions.

A Telford medal in silver, and books, suitably bound and inscribed, of the value of ten guineas, to James Leslie, M. Inst. C. E., for his "Account of the Works of Dundee Harbour," with plans and drawings of the works and the machinery employed there.

A Telford medal in silver, and books, suitably bound and inscribed, of the value of five guineas, to Robert Mallet, Assoc. Inst. C. E., for his paper "On the Corrosion of Cast and Wrought Iron in water."

A Telford medal in bronze, and books, suitably bound and inscribed, of the value of three guineas, to Charles Bourns, Assoc. Inst. C. E., for his paper "On Setting-out Railway Curves."

A Telford medal in bronze, and books, suitably bound and inscribed, of the value of two guineas, to Henry Chapman, Grad. Inst. C. E., for his "Description and Drawings of a Machine for describing the Profile of a Road."

A Telford medal in bronze, and books, suitably bound and inscribed, of the value of two guineas, to Henry Renton, Grad. Inst. C. E., for his "Description and Drawing of a Self-acting Wasteboard on the River Ouse."

Books, suitably bound and inscribed, of the value of five guineas, to Eugenius Birch, Grad. Inst. C. E., for his "Drawings and Description of the machine for sewing flat ropes, in use at Huddart's rope manufactory."

Books, suitably bound and inscribed, of the value of two guineas, to T. J. Maude, Grad. Inst. C. E., for his "Account of the repairs and alterations made in the Construction of the Menai Bridge, in consequence of the gale of January 7th, 1839."

Books, suitably bound and inscribed, of the value of two guineas, to Andrew Burn, Grad. Inst. C. E., for his drawings of a "Proposed Suspension Bridge over the Haslar Lake."

The Council would take this opportunity of calling attention to the importance of making the Institution the depository of detailed drawings, descriptions, and models of works and machinery, actually executed; also of professional books, papers, and reports, which are of little value to the individual, but which, when collected and arranged in one place, would be of inestimable value to the profession. They trust that all who have such records at their disposal will consider the great service which may thus be rendered to the cause of the advancement of professional knowledge.

TELFORD PREMIUMS, 1841.

The Council of the Institution of Civil Engineers give notice that they will award, during the ensuing session, Telford premiums to communications of adequate merit on the following subjects:—

1. An account and drawings of the original construction and present state of Plymouth Breakwater.
2. The alterations and improvements in Blackfriars Bridge.
3. The recent repairs to the Eddystone Lighthouse.
4. On the best gauge for the width of railways, with the result of the experience of existing railways.
5. On stone blocks and timber sleepers, or sills, with and without continuous timber bearings, as foundations for rails.
6. The ratio, from actual experiment, of the velocity, load, and power, of locomotive engines on railways, with the resistance to progressive motion at different velocities.
   1st. Upon levels.
   2nd. Upon inclined planes.
7. A statement of the cost of transport on railways in Great Britain, by locomotive engines, including the repairs, maintenance of way, and all incidental expenses.
8. Ditto by stationary engines, on levels or on inclined plains, including all repairs, maintenance of way, and incidental expenses, with drawings and description of the engines and machinery.
9. The causes of, and means of preventing the priming of steam boilers.
10. The quantity of water evaporated from steam boilers during experiments of not less than 12 hours' duration, if possible; including the consumption of fuel, its nature, the form and dimensions of the boilers and grates, the surfaces exposed to heat, their material and strength, and any other particulars.
11. The quantity or weight of water consumed as steam by any kind of steam engine, in the production of a definite effect; with an account and drawings of the engine, nature of the load, and methods employed to ascertain the absolute and useful effect of the steam.
12. The best description of meter for registering accurately the quantity of water used for steam boilers, or other purposes.
13. The explosion of steam boilers; especially a record of facts connected with any explosions which have taken place: also, a description, drawings, and details of the boiler, both before and after the explosion.
14. Drawings, sections, and descriptions of iron steam vessels.
15. The comparative advantages of iron and wood as employed in the construction of steam vessels.
16. On the various kinds of sheathing employed in the protection of vessels, and their relative advantages.
17. Drawings and descriptions of the engines, boilers, and general construction of steam vessels of the largest class, with a comparative tabular statement of the dimensions of the parts of engines of different powers, and their effect compared with smaller engines.
18. On the use of high-pressure steam on board steam vessels, with drawings and description of the boilers.
19. On the best relative sizes of steam vessels of all classes in comparison with their engine-power; illustrated by reference to steam vessels, already constructed, and giving their size, tonnage, speed, consumption of fuel, &c,
20. On the best application of different kinds of fuel under the boilers of steam engines, especially with reference to obtaining perfect combustion, illustrated by drawings of the boilers.
21. On the application of the screw to propelling vessels, and a comparison between it and the common paddles.
22. Common sewers in cities: the rules for and details of their construction.
23. Drawings and description of the outfall of the King's Scholar's Pond sewer.
24. Drawings and descriptions of the sewerage under the commission of Regent Street, especially of the outfall of Scotland Yard.
25. Plans and sections of blast furnaces, wth the necessary mine kilns, hot-blast stoves, and general arrangement of an iron work, with a description.
26. The comparative advantages and disadvantages of hot and cold blast in the manufacture of iron, with statements of the quality and quantity of materials employed, and produce thereof.
27. An account of the various methods lately employed for preserving timber from dry rot and other sources of decay; with the results of experience as to the kinds of timber most applicable for engineering works, and other situations where speedy destruction at present occurs.
28. A memoir of Sir Hugh Myddelton, with an account of his works.
29. A memoir of Arthur Woolf, with an account of his works.
30. A memoir of Jonathan Hornblower, with an account of his inventions and works.
31. A memoir of Richard Trevithick, with an account of his inventions and works.
32. A memoir of William Murdoch (of Soho), with an account of his inventions and works.

The communications must be forwarded to the house of the Institution, No. 25, Great George Street, Westminster, on or before the 31st of May, 1841.

It is not the wish of the council to confine the Telford Premiums to communications on the above subjects: other communications of acknowledged merit, and peculiarly deserving some mark of distinction, will be rewarded.

Copies of this paper, and any farther information, may be obtained on application to the Secretary.

CHARLES MANBY,
Secretary.

25, *Great George Street, Westminster*, 1840.

RAILWAY CONFERENCE.

On Tuesday last, the 19th inst., a general meeting of delegates from all the principal railway companies in England, was held at the Queen's Hotel, Birmingham, for the purpose of considering the best means to be adopted for preventing a recurrence of the accidents which have lately taken place on railways. A numerous and highly influential body of directors, with some of the most eminent engineers and managers of railways, attended. Mr. George Carr Glyn, the chairman of the London and Birmingham Railway Company, was called to the chair; and probably no meeting was ever held where the members represented a larger amount of property. The parties present were the representatives of considerably above 50,000,000*l.* of capital. The utmost cordiality was manifested, and the strongest desire expressed by all present to adopt every possible means of accomplishing the proposed object. Those who were most conversant with the management of railways stated their conviction that by far the greater part of the accidents which had occurred were referable to the neglect and disobedience of orders on the part of railway servants; and while some few casualties must be expected to occur in any mode of locomotion by such immense numbers of persons as are conveyed on railways, it must be to an improved state of discipline and moral responsibility on the part of the men employed on railways that the exemption from accidents must be looked for. In these sentiments every person who delivered his opinion concurred. The deliberations of the meeting lasted for several hours, during which time the regulations and signals adopted on all the principal lines were fully discussed, and the following resolutions were unanimously passed; after which the meeting broke up, with the understanding that a future conference should be convened whenever it appeared desirable:—

"Resolved, 1. That in consequence of the public anxiety, occasioned by the accidents which have taken place on various railways, the companies here represented, in order to profit by the combined experience of the principal lines, have deemed it expedient that a general conference should be held for the purpose of taking into consideration the causes and circumstances of such accidents, and the means that may be desirable of more effectually guarding against their occurrence in future.

2. That this meeting acknowledge the grave responsibility which attaches to railway directors, and the obligation under which they lie to adopt all judicious and practicable expedients for insuring the general accommodation, comfort, and safety of the passengers intrusted to their charge; that, under a strong impression of this responsibility, they have assembled on this occasion, and have pursued their deliberations at the present conference.

3. That this meeting, while it deeply regrets the accidents which have

occurred, looks forward with confidence to the beneficial result of unremitting vigilance and habitual caution steadily enforced and established, as the great means of increased safety to railway conveyance; and accordingly they would deprecate any sudden or hasty legislation on the subject, being convinced that the means referred to, aided by such improved arrangement and mechanical adaptations as a more matured experience may suggest, will amply accomplish the desired object.

4. That the moral character and general fitness of enginemen and firemen, as well of policemen and other servants, in the correct performance of whose duties the public safety is involved, are so essential to the security of railway travelling, that this meeting recommends to all railway companies the strictest examination into these points, and that it should be a rule more generally adopted amongst different managements not to employ servants having worked on other lines, without authentic and satisfactory testimonials from their former employers.

5. That in case of serious neglect of duty on the part of railway servants, it is desirable more frequently to put in force the penal provisions of Lord Seymour's Act, in order that the strictest discipline may be maintained. At the same time this meeting considers it due to men whose services are so arduous to encourage the requisite discipline and obedience of orders by adequate remuneration, and by suitable rewards for extraordinary exertions or long-sustained good conduct.

6. That the directors at this meeting assembled have taken into their serious consideration the expediency of placing on the engine a third man, as conductor or captain, in addition to the engineman and fireman usually employed, and they are of opinion that such a measure, by distracting attention, dividing authority, and removing or diminishing the responsibility of the engineman, would increase rather than lessen the risk of accidents to the train.

7. That this meeting considers it desirable that there should be an uniform system of signals recognised, and applicable to all railways; and they recommend that the following rules and regulations with this view be submitted to the consideration of each railway company."

(Here follow the regulations and signals).

RAILWAY FROM NORWICH TO LONDON BY CAMBRIDGE.

Norwich, 21st January, 1841.

THE committee appointed by the country meeting met this day, and was very numerously attended. Only four of the fifteen members appointed on it were absent, namely, Lord Berners, Sir Jacob Astley, and the Mayors of Norwich and Thetford. Lord Sondes, who presided at the public meeting, was also in the chair on this occasion. The proceedings of the Committee lasted from twelve till half past five o'clock. Mr. Rastrick was very fully examined as to the merits of the East Anglian scheme. Then Mr. Braithwaite was called in on behalf of the Eastern Counties' Company, who admitted that there was no intention of prosecuting that Company's original line by Ipswich, and stated the reasons which led the Company to think that a preferable line for the interests of Norfolk and Suffolk would be formed by branching off at Kelvedon, and going by Sudbury, Bury, and Stowmarket—Had not yet prepared any plans or sections of this new line, except of some parts, but though the country was lofty in some places, thought that by adopting higher gradients than usual, and arranging them on a compensating plan, there would be no engineering difficulty to encounter. Cross-examined at a great length by the members of the Committee.—Would not say that the plan and sections of the Kelvedon and Sudbury line could be ready for this next session. Did not know of any Company or Committee being yet formed for taking up this line, but was sure the Eastern Counties' Company and the Liverpool people would support it. Mr. Rastrick was then re-called to give some further explanations. The Committee after this remained by themselves in deliberation, after which, the parties in attendance were called in, when Lord Sondes informed them that the Committee had come to the following resolutions. (The exact words I cannot pretend to give you, but this is the substance.)

"1st. That the Committee, as far as they are able to judge from the information laid before them, are of opinion that the line of railway which will be most beneficial for Norfolk, will be one by way of Cambridge.

"2nd. That the Committee recommend to the inhabitants of Norfolk, to support no Company which does not take up the whole line from Bishop's Stortford, where the Northern and Eastern terminates, to Norwich and Yarmouth."

Of the absent members, Lord Berners, Sir Jacob Astley, and the Mayor of Thetford, are known to be in favour of a Cambridge line; and Mr. Willett, the Mayor of Norwich, is a gentleman of too much good sense to be likely to take a different view of the subject. The resolutions therefore may be considered as all but unanimous, and though they leave the field open to other lines, by Cambridge as well as the East Anglian, they are at least quite decisive of the determination of the county to have nothing more to say to the Eastern Counties' people.

DEVON AND CORNWALL RAILWAY.

A COMMITTEE meeting was held on Monday the 11th inst., at the council room, Truro, at which the Earl of Dartmouth presided. Captain Moorsom reported the progress he had made towards the completion of the survey; and we learn that his statement afforded great satisfaction, showing that he had prosecuted this important object with a diligence and perseverance which have reflected upon him the highest credit. The weather has been unpropitious, but, notwithstanding the obstacles which have presented themselves, four principal lines have been examined, and the result thus far has been, that a good practical working line has been surveyed, and the sections completed, so as to form a common trunk from Exeter to Falmouth. This line will afford an opportunity to the Plymouth and Tavistock people to avail themselves of its advantages without passing over the high land of Dartmoor, while the distance added to Mr. Rendle's line will not be more than 3½ miles, and no plane will exceed the inclination which a locomotive engine of the first class will pass over with an ordinary train at 17 or 18 miles per hour. Several members of the committee doubted whether Captain Moorsom could perfect his plans by the 1st of March next; but he expressed himself so confidently on this subject that it was determined, at the suggestion of Mr. Hutchins, to proceed with the survey.—*Cornwall Gazette.*

LIST OF PATENTS,

Continued from vol. i, *page* 280.

(SIX MONTHS FOR ENROLMENT.)

John Buchannan, of the city of Glasgow, coach builder, for "certain improvements in wheel carriages, whether for common roads or railways."—Sealed December 28.

William Bridges Adams, of Porchester Terrace, gent., for "certain improvements in the construction of wheel carriages, and of certain appendages thereto."—Sealed December 28.

John Wells, of Vale Place, Hammersmith, gent, for "for certain improvements in the manufacture of coke."—Sealed December 30.

William Henry Kempton, of the City Road, gent., for "improvements in cylinders to be used for printing calicoes, and other fabrics."—Sealed December 30.

Henry Adcock, of Winstanley, civil engineer, for "improvements in the means or apparatus for condensing, concentrating, and evaporating aeriform and other fluids."—Sealed December 30.

William Hensman, of Woburn, machinist, for "improvements in ploughs."—December 31.

Joseph Parkes, of Birmingham, button manufacturer, for "improvement in the manufacture of covered buttons."—Sealed December 31.

William Newton, of Chancery Lane, civil engineer, for "certain improvements in the rigging of ships, and other navigable vessels," being a communication.—Sealed December 31.

Francis Burdett Whitaker, of Royton, Lancaster, cotton spinner, for "certain improvements in the machinery or apparatus for drawing cotton and other fibrous substances, which improvements are also applicable to warping and dressing yarns of the same."—Sealed December 31.

Joseph Stubs, of Warrington, file manufacturer, for "certain improvements in the construction of screw wrenches and spanners, for screwing and unscrewing nuts and bolts," being a communication.—Sealed December 31.

Thomas Robert Sewell, of Carrington, Nottingham, lace manufacturer, for "certain improvements in obtaining carbonic acid from certain mineral substances."—Sealed December 31.

William Henry Kempton, of Pentonville, gent., for "improvements in lamps."—Sealed December 31.

John Grylls, of Portsea, for "improvements in machinery used for raising and lowering weights."—Sealed December 31.

Joseph Haley, of Manchester, engineer, for "an improved lifting jack for raising or removing heavy bodies, which is also applicable to the packing, or compressing of woods or other substances."—Sealed December 31.

Louis Holbeck, of Hammersmith, gent. for improvements in obtaining or producing oil," being a communication.—Sealed December 31.

Henry Scott, of Brownlow Street, Bedford Row, for "improvements in the manufacture of ink, or writing fluids."—Sealed December 31.

Charles Golightly, of Gravel Lane, Southwark, Gent., for "a new apparatus for obtaining motive power."—Sealed January 4.

George Child, of Lower Thames Street, merchant, for "improvements in the manufacture of bricks and tiles, part of which improvements are applicable to compressing peat and other materials," being a communication.—Sealed January 4.

John Swindells, of Manchester, manufacturing chemist, for "certain improvements in the manufacture of artificial stone cement, stucco, and other similar compositions."—Sealed January 6.

William Newton, of Chancery Lane, civil engineer, for "certain improvements in looms for weaving," being a communication.—January 6.

John Rock Day, of Great Queen Street, Lincoln's Inn Fields, saddler's ironmonger, for "certain improvements in the construction of collars for horses and other draft animals."—Sealed January 6.

Henry Gunter, of Cullum Street, Fenchurch Street, merchant, for "improvements in preserving animal and vegetable substances."—Sealed January 6.

Henry Bessemer, of Perceval Street, Clerkenwell, for "a new mode of checking the speed of, or stopping, railroad carriages, under certain circumstances."—Sealed January 6.

William Thomson, of Upper North Place, Gray's Inn Road, brush maker, for "improvements in the construction and mounting of various kinds of brushes and brooms."—Sealed January 8.

William Lacey, of Birmingham, agent, for "certain combinations of vitrified and metallic substances, applicable to the manufacture of ornaments, and the decoration and improvements of articles of domestic utility, and of household furniture; also applicable to church windows and ship lights."—Sealed January 11.

Mathew Uzielli, of King William Street, merchant, for "improvements in impregnating and preserving wood and timber for various useful purposes," being a communication.—Sealed January 11.

William Newton, of Chancery Lane, civil engineer, for "improved machinery for cleaning wheat and other grain or seeds from smut and other injurious matters," being a communication.—Sealed January 11.

John Barwise, of St. Martin's Lane, chronometer maker, and Alexander Bain, of No. 35, Wigmore Street, Cavendish Square, mechanists, for their invention of "improvements in the application of moving power to clocks and time-pieces."—Sealed January 11.

Thomas Harris, of Chiffnal, in the county of Salop, veterinary surgeon, for his invention of "an improved horse shoe."—Sealed January 11.

Joseph Hall, of Cambridge, grocer and draper, for his invention of "a seed and dust disperser, which is particularly applicable to the freeing of corn and other plants from insects."—Sealed January 14.

Walter Hancock, of Stratford-le-Bow, in the county of Essex, engineer, for his invention of "certain improved means of preventing accidents on railways."—Sealed Jannuary 14.

Pierre Armande Le Comte de Fontainmoreau, of Skinner Place, Sise Lane, for "an improved machinery for carding and spinning wools and haivs, which he titles 'Filo Finisher,'" being a communication.—Sealed January 14.

Melcher Garner Todd, of the Island of Saint Lucia, for "a certain improved form of apparatus for the distilling and rectification of spirits."—Sealed January 14.

John Loach, of Birmingham, brass-founder, for "certain improvements in castors, applicable to cabinet furniture and other purposes."—Sealed January 14.

William King Westly, of Leeds, flax-machinist, "for certain improvements in carding, combing, straightening, cleaning, and preparing for spinning hemp, flax, and other fibrous substances."—Sealed January 14.

William Kenworthy, of Blackburn, spinner, and James Bullough, of the same place, overlooker, for "certain improvements in machinery or apparatus for weaving."—Sealed January 14.

Charles Cameron, Esq., of Mount Vernon, Edinburgh, for "certain improvements in engines to be actuated by steam or other elastic fluid."—Sealed January 14.

Samuel Hall, of Basford, Nottingham, civil engineer, for "improvements in the combustion of fuel and smoke."—Sealed January 14.

Alexander Jones, of King Street, London, engineer, for "improvements in the manufacture of copper tubes and vessels."—Sealed January 14.

Edward Foard, of Queen's-Head Lane, Islington, machinist, for "an improved method or improved methods of supplying fuel to the fire-places or grates of steam-engine boilers, brewers' coppers, and other furnaces, as well also to the fire-places employed in domestic purposes, and generally to the supplying of fuel to furnaces and fire-places, in such a manner as to consume the smoke generally produced in such furnaces or fire-places."—Sealed January 16.

John Annes, of Plymouth, painter, for "a new and improved method of making paint from materials not before used for that purpose."—Sealed January 16.

James Smith, of Deanstone Works, Kilmadock, Perth, cotton-spinner, for "certain improvements in the preparing, spinning, and weaving of cotton, silk, wool, and other fibrous substances, and in measuring and folding woven fabrics, and in the machines and instruments for these purposes."—Sealed January 19.

Thomas Robinson, of Wilmington Square, Middlesex, Esq., for "improvements in drying woollen and other fabrics."—Sealed January 19.

Thomas Vaux, of Frederick Street, Grays Inn Lane, worsted manufacturer, for "improvements in horse shoes."—Sealed January 19.

Caleb Bedells, of Leicester, manufacturer, Christopher Nickels, of York Road, Lambeth, gent., and Archibald Turner, foreman to said Caleb Bedells, for "improvements in the manufacture of braids and plats," being partly a communication.—Sealed January 19.

John Barber, of Manchester, engraver, for "certain improvements in machinery for the purpose of tracing or etching designs or patterns on cylindrical surfaces."—Sealed January 19.

Frederick Steiner, of Hyndburn Cottage, Lancaster, Turkey-red dyer, for "improvements in looms for weaving and cutting asunder double-piled cloths, and a machine for winding weft to be used therein," being a communication.—Sealed January 19.

John Cox, of Georgie Mills, Edinburgh, tanner, for "improvements in apparatus for assisting or enabling persons to swim or float, and progress in water."—Sealed January 19.

Charles Berwick Curtis, of Acton, Esq. for "a method or methods to be used on railways for the purpose of obviating collisions between successive trains."—Sealed January 19.

Angier March Perkins, of Great Coram Street, engineer, for "improvements in apparatus for heating by the circulation of hot water, and for the construction of pipes or tubes for such and other purposes."—Sealed January 21.

John Melville, of Upper Harley Street, Esq., for "improvements in propelling vessels."—Sealed January 21.

William Hill Darker, sen., and William Hill Darker, jun., both of Lambeth, engineers, and William Wood, of Wilton, carpet manufacturer, for "certain improvements in looms for weaving."—Sealed January 21.

John Bradford Furnival, of Street Ashton, farmer, for "improvements in the construction and application of air-vessels,"being a communication.—Sealed January 21.

William Cooper, of Layham, iron-founder, for "an improved method of constructing thrashing machines, and other agricultural instruments."—Sealed January 21.

Isham Baggs, of Cheltenham, gentleman, for "improvements in printing."—Sealed January 23.

Peter Fairbairn, of Leeds, engineer, and William Suttill, of Newcastle-upon-Tyne, flax-spinner, for "certain improvements in drawing flax, hemp, wool, silk, and other fibrous substances."—Sealed January 26.

Edward Henshall, of Huddersfield, carpet manufacturer, for "certain improvements in making, manufacturing, or producing carpets and hearth rugs."—Sealed January 26.

Nathaniel Lloyd, of Manchester, and H. Rowbotham, of the same place, calico-printer, for "certain improvements in thickening and preparing colours for printing calicoes and other substances."—Sealed January 26.

Nathan Waddington, of Hulme, Lancaster, engineer, for "certain improvements in the construction of steam boilers and furnaces for heating the same."—Sealed January 26.

Cornelius Alfred Jaquin, of Huggin Lane, London, for "improvements in the manufacture of covered buttons, and in preparing of metal surfaces for such manufacture, and other purposes."—Sealed January 26.

John Bradford Furnival, of Street Ashton, Warwick, farmer, for "improvements in evaporating fluids applicable to the manufacture of salt, and to other purposes where evaporation of fluids is required," being a communication.—Sealed January 26.

Richard Jenkyn, of Hoyle, Cornwall, machinist, for "certain improvements in valves for hydraulic machines."—Sealed January 26.

William Gall, of Beresford Terrace, Walworth, gent. for "certain improvements in the construction of locomotive engines, and of the carriages used on railways, applicable in part to carriages used on common roads," being a communication.—Sealed January 28.

William Currie Harrison, of Newland Street, Eaton Square, Pimlico, engineer, for "an improved turning-table for railway purposes."—Sealed January 28.

Joseph Pryor, of Wendron, Cornwall, builder, for "an improved threshing machine."—Sealed January 28.